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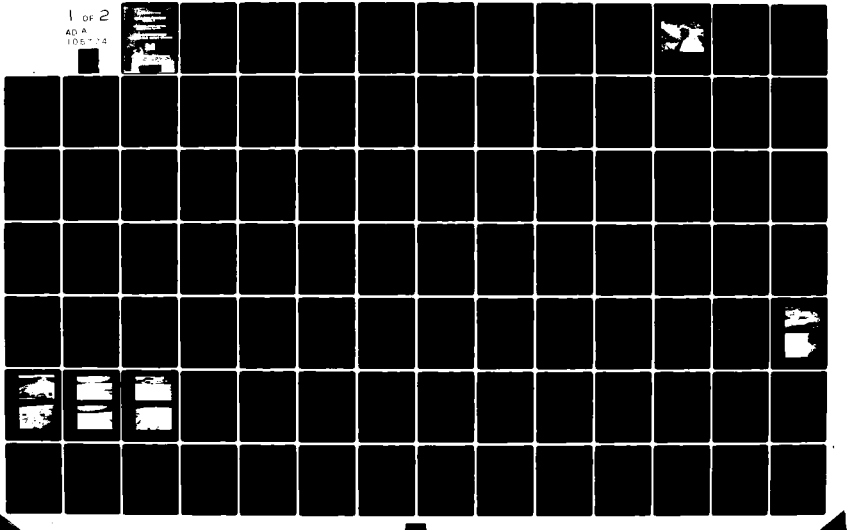

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Examination of available documents and visual inspection of Ischua Creek Watershed Dam No. 1 and appurtenant structures did not reveal conditions which constitute a hazard to human life or property.

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would not be overtopped under full PMF conditions. The PMF routed through the reservoir required 98 percent of the spillway outflow capacity. The spillway capacity is, therefore, judged as adequate.

The following remedial measures should be performed within one year from notification to owner:

- Remove the trees and saplings including the roots from the embankment slopes. Backfill the resulting voids with suitable compacted material.

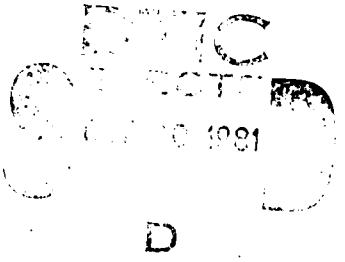
- Regrade and fill in the erosion gullies on the downstream slope and around the outlet structure. Reseed the distrubed areas.

- Place a grate over the opening in the impact basin between the inlet wall and baffle.

- The debris and vegetation should be cleared from the downstream channel, outlet basin, auxiliary spillway channel and embankment surfaces periodically. A program of periodic mowing and cutting of the embankment and outlet channels should be provided.

- Develop a formal written downstream warning system to alert the appropriate officials and residents in the event of an emergency.

- Provide a program of periodic inspection and maintenance of the dam and appurtenances including yearly operation and lubrication of the gate systems. Document this information for future reference.

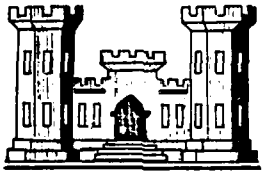


ALLEGHENY RIVER BASIN

ISCHUA CREEK WATERSHED
DAM No. 1

CATTARAUGUS COUNTY, NEW YORK
INVENTORY No. N.Y. 583

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



NEW YORK DISTRICT, CORPS OF ENGINEERS

AUGUST 1981

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the Investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I Inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event a finding that a spillway will not pass the Test Flood should not be interpreted as necessarily posing a highly inadequate condition. The Test Flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Ischua Creek Watershed Dam No. 1
State Located:	New York
County Located:	Cattaraugus
Stream:	Ischua Creek
Basin:	Allegheny River
Date of Inspection:	April 2, 1981

ASSESSMENT

Examination of available documents and visual inspection of Ischua Creek Watershed Dam No. 1 and appurtenant structures did not reveal conditions which constitute a hazard to human life or property.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would not be overtopped under full PMF conditions. The PMF routed through the reservoir required 98 percent of the spillway outflow capacity. The spillway capacity is, therefore, judged as adequate.

The following remedial measures should be performed within one year from notification to owner:

- Remove the trees and saplings including the roots from the embankment slopes. Backfill the resulting voids with suitable compacted material.

- Regrade and fill in the erosion gullies on the downstream slope and around the outlet structure. Reseed the distrubed areas.

- Place a grate over the opening in the impact basin between the inlet wall and baffle.

- The debris and vegetation should be cleared from the downstream channel, outlet basin, auxiliary spillway channel and embankment surfaces periodically. A program of periodic mowing and cutting of the embankment and outlet channels should be provided.

- Develop a formal written downstream warning system to alert the appropriate officials and residents in the event of an emergency.

- Provide a program of periodic inspection and maintenance of the dam and appurtenances including yearly operation and lubrication of the gate systems. Document this information for future reference.

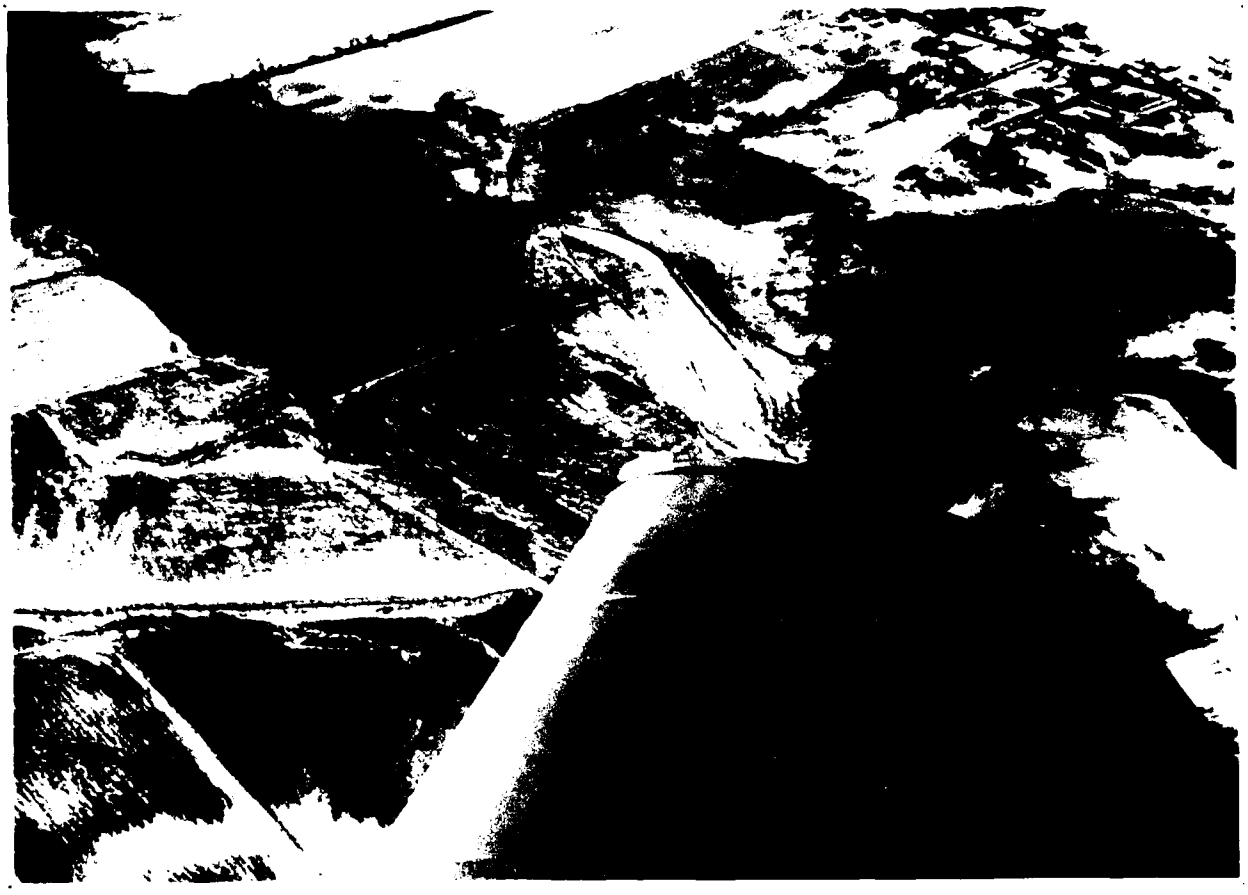
Robert J. Farrell, P.E.
New York No. 55983

Approved by:

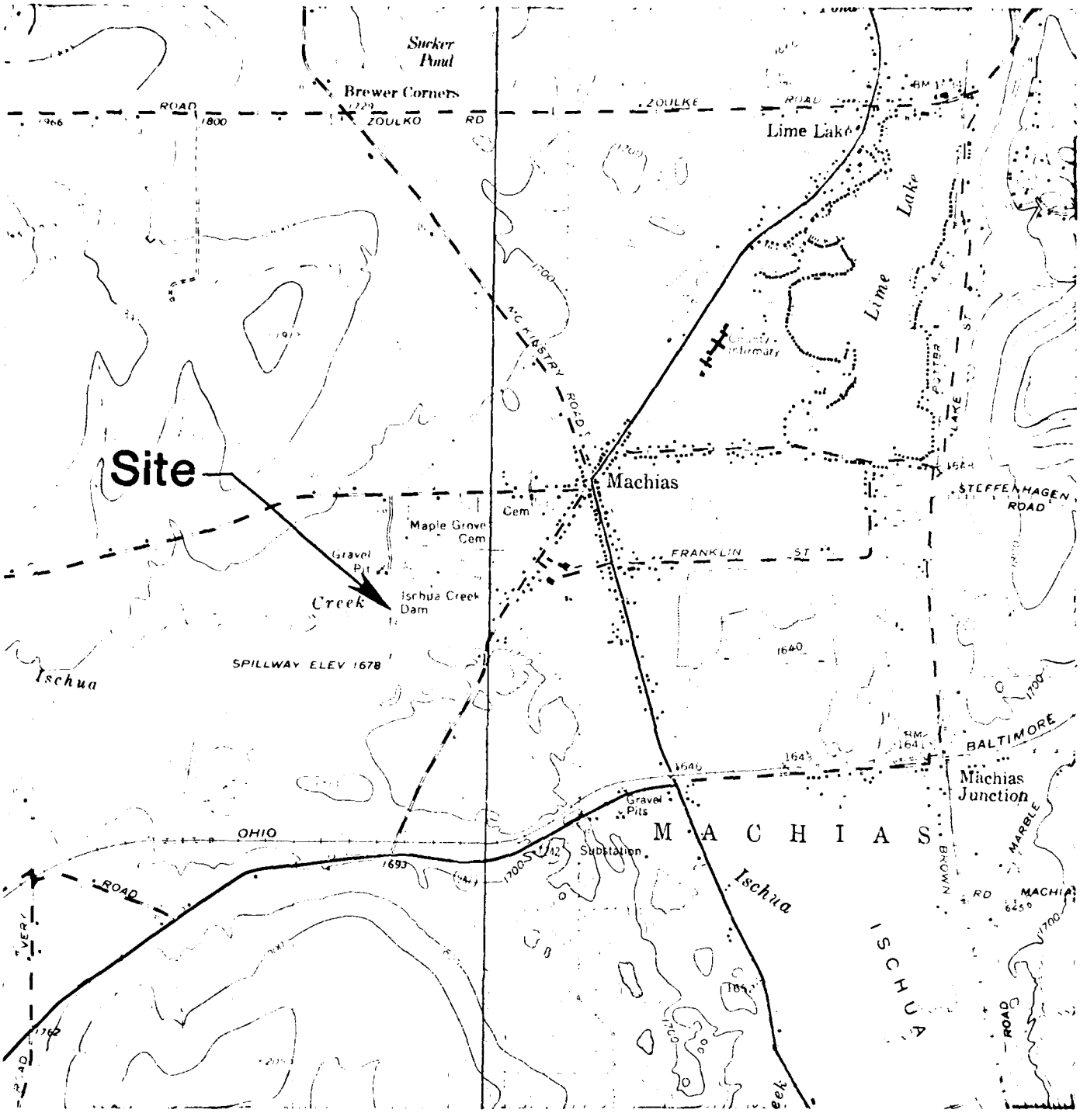
Col. W.M. Smith, Jr.
New York District Engineer

Date: 18 Aug 81

Ischua Creek Watershed
Dam No. 1



AERIAL VIEW



Ischua Creek Watershed
Dam No. 1

LOCATION PLAN

Scale: 1"=2000'

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

ISCHUA CREEK WATERSHED DAM NO. 1

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the New York District Corps of Engineers in a letter dated 24 February1981, in fulfillment of the requirements of the National Dam Inspection Act, Public Law 92-367, dated 2 August 1972.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPTION OF THE PROJECT

a. Location

The Ischua Creek Watershed Dam No. 1 is located on Ischua Creek approximately 5.5 miles northeast of Franklinville, New York. It can be reached from Felton Hill Road which intersects State Route 16 in Machias, New York. The dam is shown on U.S.G.S. West Valley, New York quadrangle with coordinates approximately at N 42° 24' 45", W 78° 30' 35" (see location plan). Page B5 of Appendix B is a site plan for this dam.

b. Description of Dam and Appurtenances

The dam consists of a zoned earthfill embankment with an earthfill cutoff trench below; a principal spillway with a reinforced concrete riser structure and outlet pipe; and two vegetated earth channel emergency spillways located to the north and south of the dam embankment. The length of the dam embankment is approximately 490 ft. The length of the dike is approximately 1300 ft. The two emergency spillways total 500 ft. in weir length.

1) Dam Embankment

The embankment appears to be made up of a central core of semi-pervious silty sand and gravel, with shells of sand and gravel. Specific materials could not be read on the available drawings. It is approximately 490 ft. long and a maximum of 27 ft. high.

The upstream slope is 3 horizontal to 1 vertical and the downstream slope is 2.5 horizontal to 1 vertical. The crest width is 14 ft.

Beneath the embankment is an earthfill cutoff trench of variable width at the bottom. According to available plans, it is constructed of the same material as the semi-pervious core.

The dam is founded on silty sand and gravel (designated GM using the Unified Soil Classification System).

2) Dike

The dike is similar in construction to the dam embankment with the exception of a berm on the upstream slope at the approximate elevation of the high level inlet. The purpose of this berm is unclear. It is not shown on the available cross section drawings. It may be for wave erosion protection during flood periods.

Beneath the dike is an earthfill cutoff trench approximately 12 feet wide at the bottom. Design drawings show this trench extending into sand or silty gravel layers.

3) North Emergency Spillway

The north emergency spillway is constructed of compacted fill with diversion berms on both sides of the channel. The grass covered channel curves around the north end of the dam embankment between the dam and the dike.

The control section is 200 ft. wide and 30 ft. long and is at elevation 1678.3 ft. (MSL). The channel downstream of the control section is approximately 500 ft. long.

The side slopes are 3 horizontal to 1 vertical and are grass covered.

4) South Emergency Spillway

The south emergency spillway is cut into sand and gravel in the south abutment. Diversion berms of compacted fill have been constructed on both sides with side slopes of 3 horizontal to 1 vertical. The grass covered channel curves around the south end of the dam embankment.

The control section is 300 ft. wide and 30 ft. long and the downstream channel is roughly 400 ft. long.

5) Principal Spillway

The principal spillway consists of a reinforced concrete drop inlet structure with two uncontrolled orifice inlets, a 54 in. diameter water pipe supported on a concrete cradle and a reinforced concrete impact basin and baffle.

The inside dimensions of the riser structure are 14.6 ft. high and 13.5 ft. wide normal to the axis of the dam. It is 4.5 ft. long parallel to the embankment and flares to 18.5 ft. long at the top. The walls of the structure are 15 in. thick. The structure is founded on a 15 ft. by 20 ft. spread footing. The "low stage inlet" is an uncontrolled opening located at the base of the structure. It is 30 in. in diameter and is located in the upstream face of the riser structure. The water flows through this orifice directly into the water pipe. It is protected by inclined trash rack assembly. This assembly is fabricated from galvanized steel angle sections.

The "high stage inlet" consists of two openings approximately 12.7 ft. above the invert of the riser structure. They are 13.5 ft. wide and 14 in. high and are located in the left and right sides of the flared portion of the riser structure. They are protected by four galvanized steel pipes placed in the sloping section below each opening. A 30 in. diameter manhole permits access into the riser structure.

The riser structure is drained by a 54 in. diameter reinforced concrete pressure pipe. It is approximately 124 ft. long and drops approximately 1.25 ft. over that length. The pipe penetrates the downstream side of the riser structure and is supported by a 14 in. thick concrete cradle within the embankment. Plans indicate 4 concrete anti-seep collars cast around the pipe within the embankment.

The downstream end of the pipe penetrates the reinforced concrete impact basin. The inside dimensions of the impact basin are 23.3 ft. wide normal to the axis of the dam and 14.3 ft. long parallel to the embankment. It is 12.7 ft. high at the upstream face and tapers to 7.3 ft. at the downstream end. At the downstream side there is a cutoff wall extending 2 ft. beneath the floor of the impact basin and there are two wingwalls extending 6 ft. beyond the walk of the basin parallel to the embankment. There is a 1 ft. thick by 7.3 ft. high baffle spanning between the walls of the impact basin.

6) Foundation and Embankment Drainage

Vertical seepage drains with graded filters are located in the downstream foundation at approximately 44 ft. downstream of the centerline of the dam and 30 ft. downstream of the centerline of the dike. In the dike, it extends from approximately 350 ft. south of the north abutment to approximately 470 ft. north of the south abutment. In the dam it extends the full length of the embankment. The drain is approximately 8 ft. wide and variable depth in the dike. In the dam a blanket drain extends under the downstream slope to the toe of the embankment. For 300 ft. to the north of the principal spillway the drain includes a system of 6 and 12 in. diameter pipe which outlets to the north and about 30 ft. downstream of the impact basin.

The drain in the dam contains a system of 6 in. and 12 in. diameter bituminous coated corrugated metal perforated pipe which outlets downstream of the impact basin in the left bank of the outlet channel.

A blanket drain extends downstream of the seepage drain to a cobble drain at the toe of both embankments.

c. Size Classification

The dam's maximum impoundment of 3677 acre-ft. places it in the INTERMEDIATE size category according to the Corps of Engineers Recommended Guidelines.

d. Hazard Classification

The hazard potential classification for this dam is HIGH because of the significant economic losses and high potential for loss of life downstream in the event of dam failure. Section 5 of this report presents more detailed discussion of the hazard potential.

e. Ownership

The dam is owned and operated by:

Cattaraugus County
James M. Cash, Chairman of Oversight Committee
RD #2
Maple Grove Road
Franklinville, New York 14737
Tele: (716) 767-3604

f. Purpose of Dam

The purpose of this dam is to reduce downstream flooding by providing temporary storage for the runoff from 8,384 acres. The temporary storage is released gradually through the two-stage principal spillway system.

g. Design and Construction History

The dam was built under the Watershed Protection and Flood Prevention Act by the Ischua Creek County Small Watershed Protection District with the assistance of the Soil Conservation Service. It was completed in 1964.

h. Normal Operating Procedures

The dam is normally self-regulating.

1.3 Pertinent Data

a. Drainage Area

The drainage area for this dam covers 13.1 square miles. It is made up primarily of rolling pasture and woodland and minor development.

b. Discharge at Dam Site

1) Outlet Works

Normal discharge at the site is through the 54 in. diameter outlet pipe. In the event of severe flooding, water would flow over the emergency spillway at elevation 1678.3 ft. (MSL). The invert of the low stage orifice is at elevation 1659.5 ft. (MSL). The invert of the high stage orifice is at elevation 1672.2 ft. (MSL)

2) Maximum Known Flood

There is no data available for the maximum known flood at dam site. Evidence of recent high water was observed at elevation 1661.5 ft. (MSL).

3) Ungated Spillway Capacity at Top of Dam

The capacity of the principal spillway with the reservoir at top of dam elevation (1682.3 ft MSL) is 535 cfs. The capacity of the emergency spillway is 12,600 cfs at this level.

4) Ungated Spillway Capacity at Test Flood

The capacity of the principal spillway with the reservoir at test flood elevation (1682.2 ft. MSL) is 532 cfs. The capacity of the emergency spillway is 12,282 cfs at this level.

5) Gated Spillway Capacity at Normal Pool

There are no gated spillways.

6) Gated Spillway Capacity at Test Flood

As previously mentioned, there are no gated spillways.

7) Total Spillway Capacity at Test Flood

The total spillway capacity at test flood elevation (1682.2 ft. MSL) is 12,814 cfs.

c. Elevation (ft. above NGVD)

1) Streambed at toe of dam: 1655.3
2) Bottom of cutoff: variable, approximately 1650 minimum
3) Maximum tailwater - unknown, outlet conduit invert 1658.3
4) Normal pool: 1659.5
5) Full flood control pool: 1678.3
6) Spillway crest - Low level orifice: 1659.5
   High level orifice: 1672.2
   Emergency spillways: 1678.3
7) Design surcharge (original Design): 1678.3
8) Top of Dam: 1682.3
9) Test flood surcharge: 1682.2

d. Reservoir (Length in feet)

1) Length of maximum pool: 6000$^{+}_{-}$ ft.
2) Length of normal pool: 0$^{+}_{-}$ ft.
3) Length of flood control pool: 5500$^{+}_{-}$ ft.

e. Storage (acre-feet)

1) Normal pool: 0
2) Flood control pool: 2347
3) Spillway crest pool:
   a) Low stage inlet: 0
   b) High stage inlet: 962
   c) Emergency spillway: 2347

4) Top of dam: 3677

5) Test flood pool: 3619

f. Reservoir Surface (acres)

1) Normal pool: 0

2) Flood control pool: 280

3) Spillway crest pool

a) Low stage inlet: 0

b) High stage inlet: 167

c) Emergency spillway: 280

4) Test flood: 338

5) Top of dam: 347

g. Dam

1) Type: Earth Embankment

2) Length: 490 ft.

3) Height: 27 ft.

4) Top Width: 14 ft.

5) Side Slopes:

Upstream: 3H:1V

Downstream: 2.5H:1V

6) Zoning: Semi-pervious core surrounded by sand and gravel shells, seepage drain under 70% of downstream embankment.

7) Impervious Core: Semi-pervious silty sand and gravel

8) Cutoff: Variable width, earthfill

9) Grout Curtain: None

h. Dike

1) Type: Earth Embankment

2) Length: Approximately 1300 ft.

3) Height: Approximately 22 ft. maximum

4) Top Width: 14 ft.

5) Side Slopes:

Upstream: 3H:1V
Downstream: 2.5H:1V

6) Zoning: Semi-pervious core surrounded by sand and gravel shells, seepage drain under 80% of downstream embankment.

7) Impervious Core: Semi-pervious silty sand and gravel

8) Cutoff: 12 ft. bottom width, earthfill

9) Grout Curtain: None

i. Diversion and Regulating Tunnel

Not applicable

j. Spillways

1) Type:

a) Principal Spillway: Reinforced concrete drop inlet

b) North Emergency Spillway: Grass covered earth channel constructed of compacted earthfill at the north end of the main dam

c) South Emergency Spillway: Grass covered earth channel cut in south abutment

2) Length of Weir:

a) Low Level Orifice: 30 in. dia pipe

b) High Level Orifice: 27 ft.

c) North Emergency Spillway: 200 ft.

d) South Emergency Spillway: 300 ft.

3) Crest Elevation: (feet above NGVD)

a) Low Level Orifice: 1655.3

b) High Level Orifice: 1672.2

c) North Emergency Spillway: 1678.3

d) South Emergency Spillway: 1678.3

4) Gates: None

5) Upstream Channel: Ischua Creek, narrow stream to reservoir through farm and woodland

6) Downstream Channel: Ischua Creek, narrow stream through farm and woodland

k. Regulating Outlet: None

SECTION 2 - ENGINEERING DATA

2.1 GEOLOGY

Bedrock at the dam site is Upper Devonian Age (345-375 million years ago) interbedded shale and siltstone of the Canadaway Group. This flat-lying sedimentary rock is relatively underformed. Regionally, the bedrock forms a homocline dipping approximately 40 feet per mile. Small terraces and low folds locally modify this dip to essentially flat-lying over short distances. Only minor folding and faulting are found in the region with no major or active faults known to exist in the area.

The Ischua Creek Watershed Dam No. 1 is in a region classified as Zone 2 seismicity, as shown on Figure No. 1 of the Recommended Guidelines for Safety Inspection of Dams.

Pleistocene Glaciation (beginning approximately 2 million years ago) has modified topography by means of erosion and deposition. The thick continental ice sheet advanced southward from Quebec and Ontario smoothing terrain by glacial scour and mantling uplands with till deposits. The pleistocene geology of the dam site is that of glacial outwash deposits. Generally coarse sands and gravels were deposited by strongly aggrading streams flowing from former ice sheets. Typically, a veneer of dense glacial till under the gravel and sands is also common to the area. In recent times, alluvial silts and sands from upslope erosion areas have been deposited on the glacial materials.

2.2 SUBSURFACE INVESTIGATION

Test hole logs are contained in the "As-Built" drawings; however, the copies are illegible and are not included in Appendix B.

2.3 DESIGN RECORDS

The records available for the project consists of 14 contract drawings which show the plans, sections and details of the dam, appurtenant structures, impact basin details and grating, fencing details, and logs of test holes, and a design report issued by the U.S. Soil Conservation Service dated April 19, 1963.

2.4 CONSTRUCTION RECORDS

Construction records and specifications are available at the U.S. Soil Conservation Service, Design Section, Syracuse, N.Y.

The sedimentation basin structure shown on Page 2 of the "As-Built" drawings was not found during the visual inspection.

2.5 OPERATION RECORDS

No written maintenance or operation records exist for the dam

2.6 EVALUATION OF DATA

Information obtained from the "As-Built" drawings is consistent with observations made during this inspection. The information obtained from available data was considered adequate for the Phase I inspection and evaluation.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

a. General

The Ischua Creek Watershed Dam No. 1 is in good condition at the present time.

b. Dam

1) Earth Embankment (See Photos 1, 5, 7 and 8

The brush growth is heavy on this embankment impeding inspection of the slopes. Shrubs were noted along the north upstream abutment contact and small trees are growing just to the north of the intake structure on the upstream slope and along the cobble drain at the north downstream toe.

Erosion gullies 24 in. wide and 6 in. deep were noted in the north downstream abutment contact and smaller (12 in) gullies were found at the south downstream contact and approximately 30 ft. north of the impact basin structure. Erosion gullies were also noted around the wing walls of the outlet structure.

The crest of the dam is rutted up to 2 to 4 in. deep by vehicular and horse traffic and evidence of campfires was noted at the south end.

There is no slope protection on the upstream slope other than the vegetative cover. Approximately 1 to 2 inches of erosion due to wave action was noted at the water line on the upstream slope.

The toe drain under the north downstream slope appears to be functioning properly as no seepage was noted at the dam. The outlet pipe for the drain was partially submerged at the time of the inspection and any discharge could not be distinguished from the stream flow. No staining was observed at the outlet pipe.

2) North Dike (See Photo 7)

The dike is covered with a heavy mat of grass and brush. Shrubs or small trees were noted growing on the upstream and downstream slopes at the bend in the dike, and on the upstream slope at the south end of the dike.

Wet areas were noted along the downstream toe along much of the dike. The elevation of these areas is above that of the reservoir. Therefore, the areas are the result of natural groundwater and the recent spring thaw. The small eddy current type erosion gullies were noted in these areas but no visible flow was noted during the inspection.

Two 6 in. diameter rodent holes were found approximately 250 ft. and 300 ft. from the north abutment at mid height of the upstream slope and the crest is rutted up to 4 in. deep by vehicular and horse traffic.

3) North Emergency Spillway

This spillway is in good condition with the exception of three 6 in. diameter rodent holes in the north slope downstream of the control section. There are also 3 ruts across the channel from motorcycle and horse traffic. These ruts are up to 4 in. deep and 18 in. wide.

4) South Emergency Spillway (See photos 5 and 6)

This spillway is in good condition with the exception of three 6 in. diameter rodent holes in the south slope approximately at the control section of the spillway channel. Some wet areas were noted but they are the result of natural groundwater or ponded runoff.

c. Appurtenant Structures

1) Drop Inlet Service Spillway (See photos 1 and 2)

The structure is in good condition with no evidence of spalling, cracking, or efflorescence. The trash racks are in good condition, although a minor amount of debris was lodged in the low level trash rack.

2) Impact Basin

The structure is in good condition. Minor spalling was observed on the concrete baffle. Minor erosion behind both wingwalls were noted. There is a 5' x 14'1" opening between the inlet wall and baffle that presents a potential hazard to people.

d. Reservoir Area

The shore of the reservoir is generally shallow sloping pasture or woodland. It appears to be stable and in good condition.

e. Downstream Channel (See photo 3)

The downstream channel is a narrow channel passing over relatively flat flood plain. There is rip rap protection of the plunge pool, but erosion of the banks has taken place above the level of the eroded up to 300 feet downstream of the outlet.

3.2 Evaluation

The dam is generally in good condition. The potential problems noted during the visual inspection are listed below.

a) Drainage gullies and tire ruts on the main dam, north dike and left emergency spillway.

b) Animal burrows on north dike and both emergency spillways.

c) Debris on upstream slope and in the low level trash rack of the intake structure.

d) Erosion of the downstream channel and the upstream slope of the dam at the waterline.

e) Trees growing on the north dike and the main dam embankment.

f) The opening between the inlet wall and baffle of the impact basin.

SECTION 4 - OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

No written operation and maintenance procedures exist for the project. The normal operation of the project consists of allowing water to flow through the service spillway outlet pipe.

4.2 MAINTENANCE OF DAM

Maintenance of the dam is performed when the need arises. Maintenance is not considered adequate as evidenced by trees and brush, animal burrows, etc.

4.3 WARNING SYSTEM IN EFFECT

No warning system is in effect or in preparation.

4.4 EVALUATION

The overall condition of the dam and appurtenant structures appears to be good. Recommendations in connection with regular maintenance are discussed in Section 7.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 Drainage Area Characteristics

Ischua Creek Watershed Dam No. 1 is located on Ischua Creek, a tributary of Olean Creek in the Allegheny River basin, and has a drainage area of 13.1 square miles. The dam is situated approximately 5.5 miles northwest of Franklinville, New York, and 0.5 miles southwest of Machias, New York. The topography of the watershed is gentle rolling hills.

5.2 Design Data

This dam was designed as a Class C structure in accordance with criteria established in Washington Engineering Memorandum SCS-27. Under this classification, the emergency spillway is designed for a rainfall equal to P(100) + 0.26[PMP - P(100)], while the freeboard pool is designed for the PMP rainfall.

The Soil Conservation Service (SCS) design calculations have been reviewed. The dam was designed to pass the 10-year flood with antecedent moisture condition III plus snowmelt without discharging through the emergency spillway. The peak outflow is 416 cfs and the peak elevation is 1678.3 ft. (MSL). The dam was also designed to contain the runoff for the 100-year flood without discharging through the emergency spillway. The SCS design allowed for a 50-year sediment accumulation with a storage of 29 acre-ft. The principal spillway consists of a 54 in. diameter reinforced concrete water pipe and a 4.5 ft. x 13.5 ft. reinforced concrete riser with two 13.5 ft. x 14 in. openings. The riser has a 30 in. diameter orifice with invert elevation of 1659.5 ft. (MSL). The north and south emergency spillway control cross sections are 200 feet and 300 feet wide, respectively, with side slopes of 3 horizontal to 1 vertical and a crest elevation of 1678.3 ft. (MSL). The dam crest elevation is 1682.3 ft. (MSL).

5.3 Analysis Criteria

The analysis of the spillway capacity of the dam and the storage of the reservoir was performed using the Corps of Engineers HEC-1 Dam Safety Version computer model. The unit hydrograph was defined by the Snyder Synthetic Unit Hydrograph method, and the Modified Puls routing procedure was incorporated. The Probable Maximum Precipitation (PMP) was 22.4 in. (24 hours 200 sq. miles) from Hydrometerological Report #33 in accordance with the Recommended Guidelines of the Corps of Engineers. The dam is 27 feet high and impounds approximately 3677 acre feet at the top of the dam. The dam is classified as a HIGH hazard and INTERMEDIATE in size, according to the Recommended Guidelines of the Corps of Engineers. The spillway design flood is the Probable Maximum Flood (PMF). The floods selected for analysis were 20, 40, 50, 60, 80, and 100% of the PMF flows. The PMF inflow of 13,563 cfs was routed through the reservoir and the peak outflow was determined to be 12,814 cfs. The peak PMF outflow would produce an eroding velocity of 9.4 ft/sec on the emergency spillways.

5.4 Reservoir Capacity

The reservoir capacities at the crest of the emergency spillway and at the top of the dam are 2347 acre-ft. and 3677 acre-ft, respectively. Surcharge storage between the emergency spillway crest and the top of dam is equivalent to 1.9 in. of runoff from the drainage area.

5.5 Experience Data

There are no flood records for the dam site, however, during the field investigation, evidence of recent high water was observed at elevation 1674.1 ft. (MSL). This reservoir elevation corresponds to a peak outflow of 264 cfs.

5.6 Overtopping Potential

The maximum capacity of the spillways is 13,135 cfs which is greater than the PMF peak outflow of 12,814 cfs. The dam is not overtopped by the PMF, the peak elevation being 0.1 feet below the top of the dam.

5.7 Analysis of Downstream Impacts

During the field investigation, dwellings and highways located downstream of the dam were identified and referenced to the channel invert. The cross section locations used in the downstream channel routing are shown on Page D-2 Appendix D. The impacts of the PMF on dwellings located downstream of the dam are shown in Table 5.1. For the purposes of this analysis, a danger of loss of life was assumed to exist if the computed PMF water surface was above the first floor elevation of a structure. This situation occurrs at two structures (Locations 1 and 2). The road crossings at locations 1, 2, and 3 are all overtopped during the PMF.

5.8 Evaluation

The spillway of Ischua Creek Watershed Dam No. 1 will safely pass the PMF without overtopping. The spillway is therefore assessed as "Adequate". Potential problems include:

a) Erosion of the emergency spillway for the test flood conditions. Because of the low probability of occurrence of the PMF, and because there is no cost effective means of preventing the erosion, no preventative recommendations are deemed necessary.

b) The danger of loss of life and economic damage downstream of the dam for the test flood conditions.

TABLE 5.1

SUMMARY OF DOWNSTREAM IMPACTS FOR PMF

Location # (see page D-2 Appendix D)	Location	# of Dwellings	Structure Height above Streambed* (ft)	Peak Flow (cfs)	Peak Stage (ft)	Comments
-	At Dam	-	-	12,814	-	-
1	Road crossing 1600' d/s of dam	1	8	12,813	11	Danger of loss of life. Road overtopped.
2	Rt NY16 crossing	2 1	12 8	12,823	10	Danger of loss of life. Road overtopped.
3	Road crossing 1900' d/s of Rt NY16	9	17	12,821	10	Road overtopped
4	1700' d/s of Location 3	1	20	12,816	8	-

*The structure height above the streambed is the elevation of the first floor above the channel invert.

SECTION 6 - STRUCTURAL STABILITY

6.1 Visual Observations

There does not appear to be significant displacement or distress associated with the embankments at this site. The dam appears to be in good condition at the present time.

6.2 Design and Construction Data

Analyses carried out during the design and construction phase included a slope stability analysis under full drawdown conditions by a modified Swedish circle method. The soil parameters assumed were:

Core: $\phi = 20.5^{\circ}$, c = 200 psf, 1.5:1 slope

Shells: $\phi = 35.0^{\circ}$, c = 0, 3:1 slope U.S., 2.5:1 slope D.S.

The factors of safety calculated were 1.43 for the upstream slope and 1.68 for the downstream slope. Adding a 10 ft. wide berm to the upstream slope raised the factor of safety to 1.72. An analysis by the infinite slope method resulted in a factor of safety of 1.06 against a shallow failure of the upstream embankment shell. The calculated factors of safety are considered marginally adequate according to the recommended Phase I guidelines.

6.3 Post Construction Changes

There have been no known changes to any of the embankments or structures at this dam.

6.4 Seismic Stability

The dam is located in Seismic Zone No. 2 and, in accordance with the recommended Phase 1 guidelines, a seismic stability analysis is not warranted.

SECTION 7 - ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

Examination of the available documents and visual inspections of Ischua Creek Watershed Dam No. 1 and appurtenant structures did not reveal any conditions which constitute a hazard to human life or property. The earth embankment is considered to be stable under present conditions.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would not be overtopped for the full PMF. The principal and auxiliary spillway capacities are, therefore, judged as adequate.

b. Adequacy of Information

This report and its conclusions are based on visual inspection, interview data, contract drawings, and office hydrologic/hydraulic studies. This information and data are adequate for a Phase I inspection.

c. Need for Additional Investigations

No additional investigations are required for the project

d. Urgency

All remedial actions described below should be completed within one year of notification to the owner.

7.2 RECOMMENDED MEASURES

a. Remove the trees and saplings including the roots from the embankment slopes. Backfill the resulting voids with suitable compacted material.

b. Regrade and fill in the erosion gullies on the downstream slope and around the outlet structure. Reseed the disturbed areas.

c. Place a grate over the opening in the impact basin between the inlet wall and baffle.

d. The debris and vegetation should be cleared from the downstream channel, outlet basin, auxiliary spillway channel and embankment surfaces periodically. A program of periodic mowing and cutting of the embankment and outlet channels should be provided.

e. Provide a program of periodic inspection and maintenance of the dam and appurtenances. Document this information for future reference.

f. Develop a formal written downstream warning system to alert the appropriate officials and residents in the event of an emergency.

APPENDIX A

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam IschuaCreek Watershed Dam No. 1

Fed. I.D. # NY 00583 DEC Dam No. 19-3241

River Basin Allegheny

Location: Town Machias County Cattaraugus

Stream Name Ischua Creek

Tributary of Olean Creek

Latitude (N) 42° 24.8' Longitude (W) 78° 30.3'

Type of Dam Earth Embankment

Hazard Category High

Date(s) of Inspection April 2, 1981

Weather Conditions Sunny, windy 50°

Reservoir Level at Time of Inspection Approximately elevation 1661.5

b. Inspection Personnel Mr. Bob Farrell, Mr. Ken Avery, Mr. Jim Reynolds, Mr. Jeff Hardin

c. Persons Contacted (including Address & Phone No.)

U.S Soil Conservation Service, Rm 771-Federal Bldg., So. Clinton St., Syracuse, N.Y.

State Construction Engineer: Philip "Skip" Nelson 1-315-423-5502

Area 1 Project Engr (Batavia): Pete Wright 1-716-343-3664

Contracting Officer for Ischua Creek Watershed: Ed Smith-Contacted through Pete Wright

d. History:

Date Constructed 1964 Date(s) Reconstructed

Designer U.S.D.A. Soil Conservation Service

Constructed by

Owner

) Embankment

a. Characteristics

(1) Embankment Material Sand and Gravel. Specific details of core material could not be read from drawings

(2) Cutoff Type Trench cut into natural ground, variable depth, generally 12 feet wide at bottom. Cut into silty sand and gravel

(3) Impervious Core There is a core 12 feet thick shown on the construction drawings, the material could not be identified

(4) Internal Drainage System Trench drain with 6" diameter. BCCM perforated pipe from STA. 23+00 to 26+00. Blanket drain downstream of trench.

(5) Miscellaneous Side slopes 2.5H:1V downstream and 3H:1V upstream

b. Crest

(1) Vertical Alignment Good

(2) Horizontal Alignment Good

(3) Surface Cracks None noted

(4) Miscellaneous There are signs of campfires near the right abutment and the crest is rutted from vehicle traffic.

c. Upstream Slope

(1) Slope (Estimate) (V:H) 1Vertical to 3 Horizontal

(2) Undesirable Growth or Debris, Animal Burrows Brush and grass need regular mowing. Brush growing at left abutment contact and a tree approximately 20 feet high is about 10 feet left of the inlet structure. There is drift-wood and floating debris on the upstream slopes to approximately the level of the high level inlet.

(3) Sloughing, Subsidence or Depressions None noted

) Dike

a. Characteristics

(1) Embankment Material Appears to be constructed of silty sand and gravel similar to the dam itself.

(2) Cutoff Type Trench 12 feet wide at bottom, variable depth, material similar to core of main dam

(3) Impervious Core Shown on plans but material was not identified.

(4) Internal Drainage System Trench and blanket drains exiting to a cobble drain along the downstream toe

(5) Miscellaneous

b. Crest

(1) Vertical Alignment Good

(2) Horizontal Alignment Good

(3) Surface Cracks None noted

(4) Miscellaneous Rutted due to vehicular traffic

c. Upstream Slope

(1) Slope (Estimate) (V:H) 1 Vertical to 3 Horizontal

(2) Undesirable Growth or Debris, Animal Burrows Two 6" diameter animal burrows at mid height, 280' to 300' from left abutment. Trees at bend and at right abutment.

(3) Sloughing, Subsidence or Depressions None noted

(4) Slope Protection None provided other than grass. Small eddy current erosion gullies (1" x 1") were noted all along the upstream slope of the dike near the toe

(5) Surface Cracks or Movement at Toe None noted

d. Downstream Slope

(1) Slope (Estimate - V:H) 1 Vertical to 2.5 Horizontal

(2) Undesirable Growth or Debris, Animal Burrows Trees growing near toe at the bend in the dike.

(3) Sloughing, Subsidence, or Depressions None noted

(4) Surface Cracks or Movement at Toe None noted

(5) Seepage Wet areas were noted along the downstream toe but these were higher in elevation than the impoundment pool and therefore are the result of natural groundwater.

(6) External Drainage System (Ditches, Trenches, Blanket) Cobble drain along the downstream toe

(7) Condition Around Outlet Structure Not applicable

(8) Seepage Beyond Toe None noted

e. Abutments - Embankment Contact

(1) Erosion at Contact Small (1" x 1") eddy current gullies noted

(2) Seepage Along Contact None noted

4) Drainage System

(a) Description of System Perforated pipe installed for approximately 300 ft. to the left of the principal spillway. System consists of 6" and 12" diameter bituminous coated corrugated metal pipe and daylights approximately 30 ft. downstream of the impact basin on the left bank of the outlet channel

(b) Condition of System Good

(c) Discharge from Drainage System Outlet was partially submerged at the time of inspection and discharge could not be observed.

5) Instrumentation (Momumentation/Surveys, Observation Wells, Weirs, Piczometers, etc.) None installed

6) Reservoir

a. Slopes Appears stable and in good condition

b. Sedimentation Very minor accumulation

c. Unusual Conditions Which Affect Dam None noted

7) Area Downstream of Dam

a. Downstream Hazard (No. of homes, highways, etc) Refer to Table 5.1 for a summary of downstream dwellings and highways

b. Seepage, unusual growth None noted

c. Evidence of movement beyond toe of Dam None noted

d. Conditions of Downstream Channel Generally fair, channel slopes eroded due to stream flow, rip rap placed is insufficient as evidenced by erosion behind it

7) Spillway(s) (including Discharge Conveyance Channel)

Principal Spillway: Drop inlet structure with outlet conduit to impact basin. Vegetated earth emergency spillways: 300 ft. wide at south abutment, 200 ft. wide at north abutment.

a. General Good

b. Condition of Service Spillway Excellent

c. Condition of Auxiliary Spillway Generally good. North spillway (left) shows rutting and animal burrows, right shows animal burrows. The grass needs mowing.

d. Condition of Discharge Conveyance Channel Channel banks eroded up to 300 ft. downstream.

8) Reservoir Drain/Outlet NONE

Type: Pipe____ Conduit____ Other____

Material: *Concrete*____ *Metal*____ Other____

Size:____ Length____

Invert Elevations: Entrance____ Exit____

Physical Condition (Describe): Unobservable____

Material:____

Joints:____ Alignment____

Structural Integrity:____

Hydraulic Capability:____

Means of Control: Gate____ Valve____ Uncontrolled____

Operation: Operable____ Inoperable____ Other____

Present Condition (Describe):____

9) Structural

a. Concrete Surfaces N/A

b. Structural Cracking N/A

c. Movement - Horizontal & Vertical Alignment (Settlement) N/A

d. Junctions with Abutments or Embankments N/A

e. Drains - Foundation, Joint, Face N/A

f. Water Passages, Conduits, Sluices N/A

g. Seepage or Leakage N/A

h. Joints - Construction, etc. N/A

i. Foundation N/A

j. Abutments N/A

k. Control Gates N/A

l. Approach & Outlet Channels N/A

m. Energy Dissipators (Plunge Pool,etc) N/A

n. Intake Structures N/A

o. Stability N/A

p. Miscellaneous N/A

10) Appurtenant Structures (Power House, Lock, Gatchouse, Other)

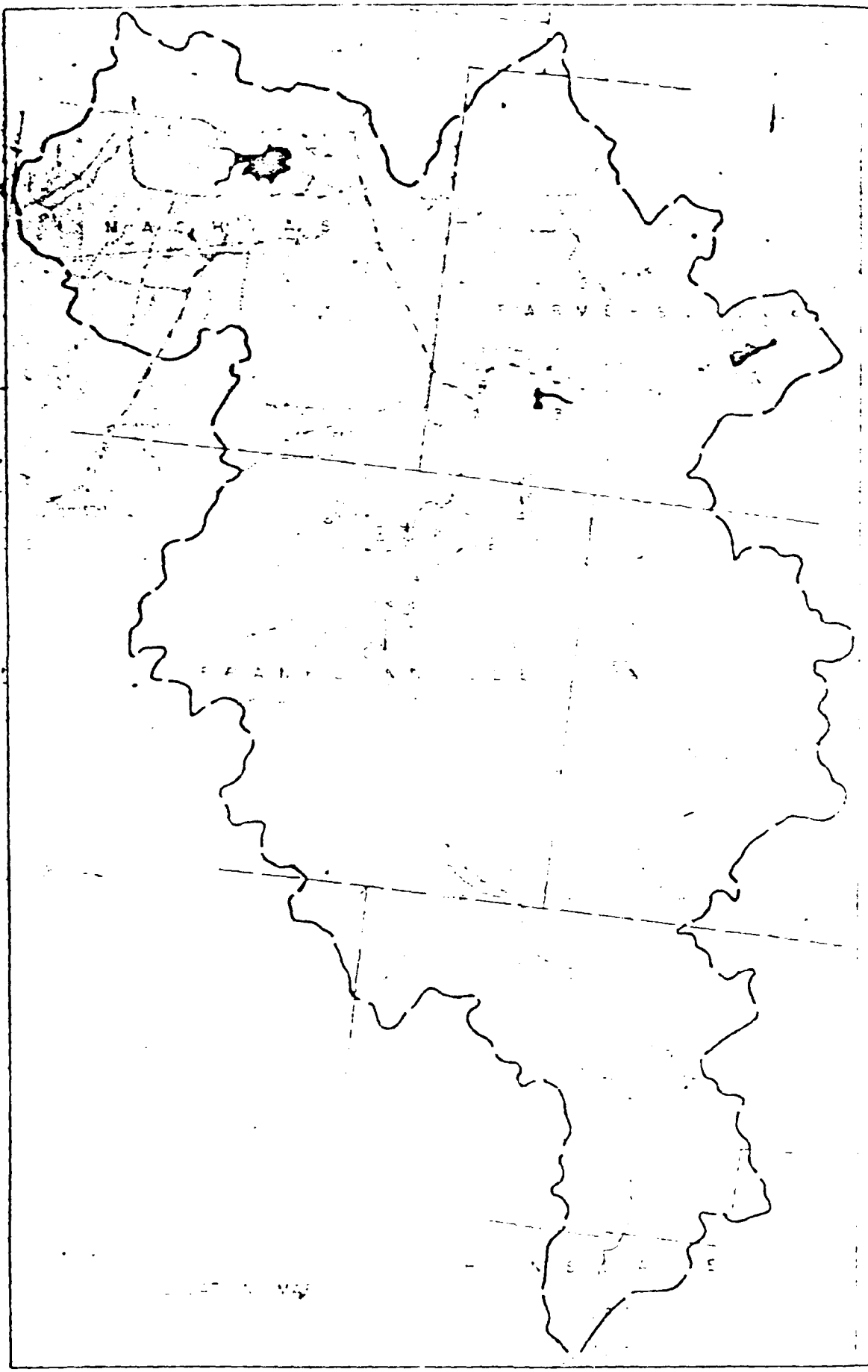
a. Description and Condition None

APPENDIX B

ENGINEERING DATA

APPENDIX B

TITLE	PAGE
Cover Sheet	B-2
Plan of Storage Areas	B-3
Clearing Traverses	B-4
Plan of Damsite	B-5
Profiles	B-6
Profiles	B-7
Seepage Drain Details	B-8
Layout of Filter Drainage Pipes	B-9
Plan - Profile of Principal Spillway	B-10
Riser Details	B-11
Collar-Cradle-Trash Racks & Misc. Details	B-12
Impact Basin Details	B-13



ISCHUA

FL

BUIL

ISCHUA CREEK WATERSHED PROJECT

FLOODWATER RETARDING DAM NO 1

583

DRAINAGE AREA	8364	Acres
FLOOD STORAGE (EMERGENCY SPILLWAY CREST)	2347	Acre-Feet
WATER SURFACE AREA (EMERGENCY SPILLWAY CREST)	280	Acres
HEIGHT OF DAM	38	Feet
VOLUME OF FILL	88,980	Cubic Yards

BUILT UNDER THE WATERSHED PROTECTION AND FLOOD PREVENTION ACT

By

ISCHUA CREEK COUNTY SMALL WATERSHED PROTECTION DISTRICT

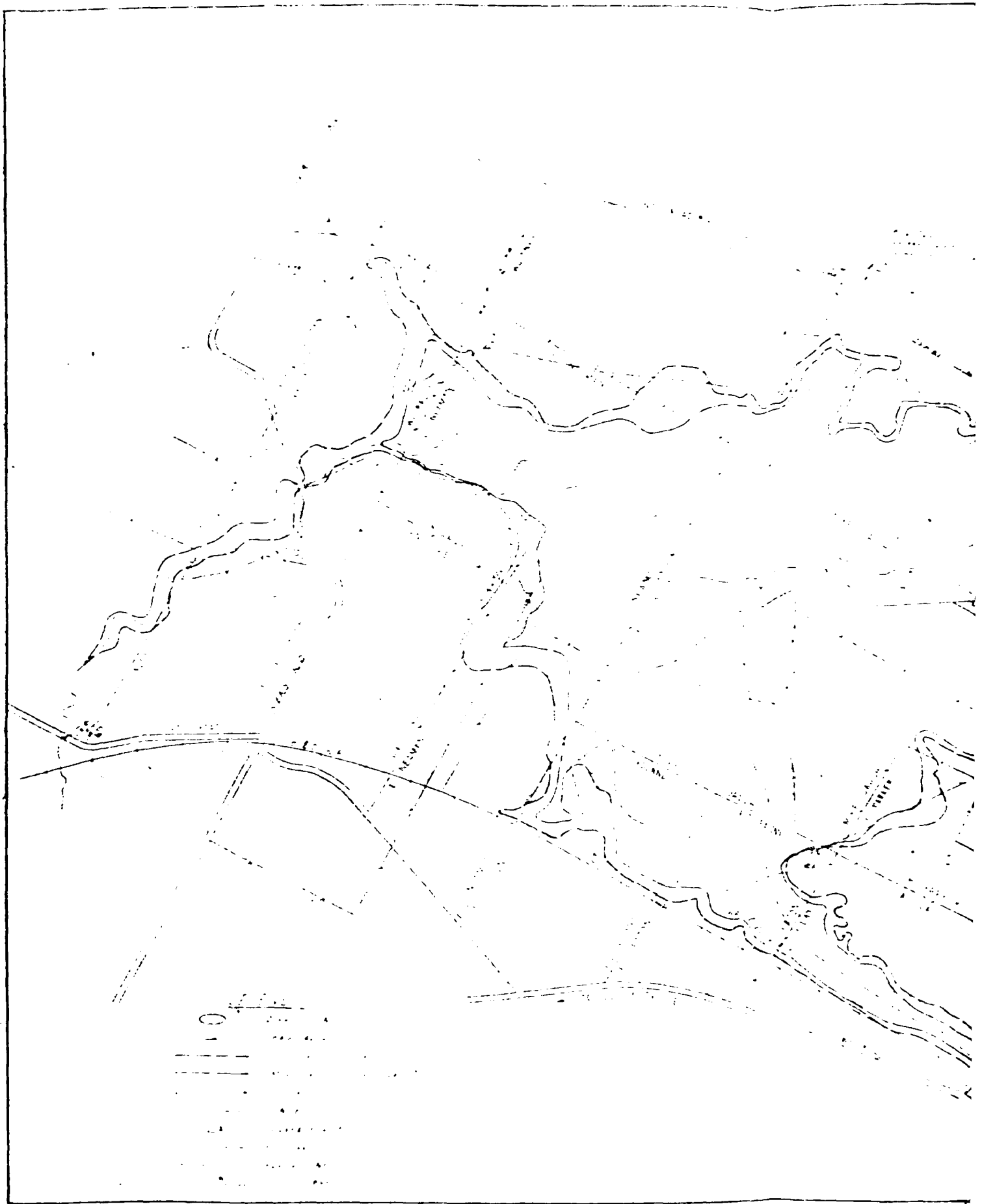
WITH THE ASSISTANCE OF

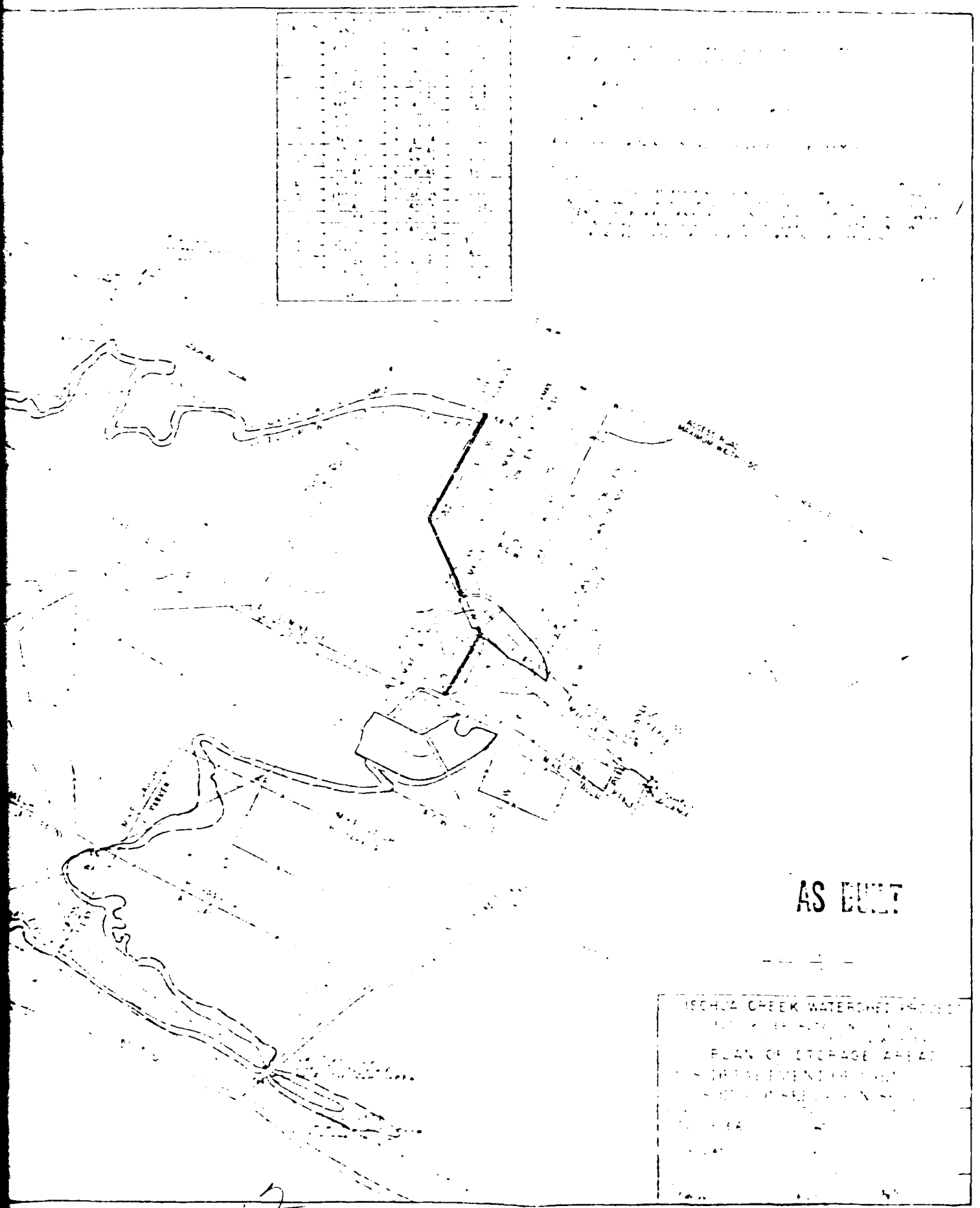
SOIL CONSERVATION SERVICE

OF THE

U S DEPARTMENT OF AGRICULTURE

1963

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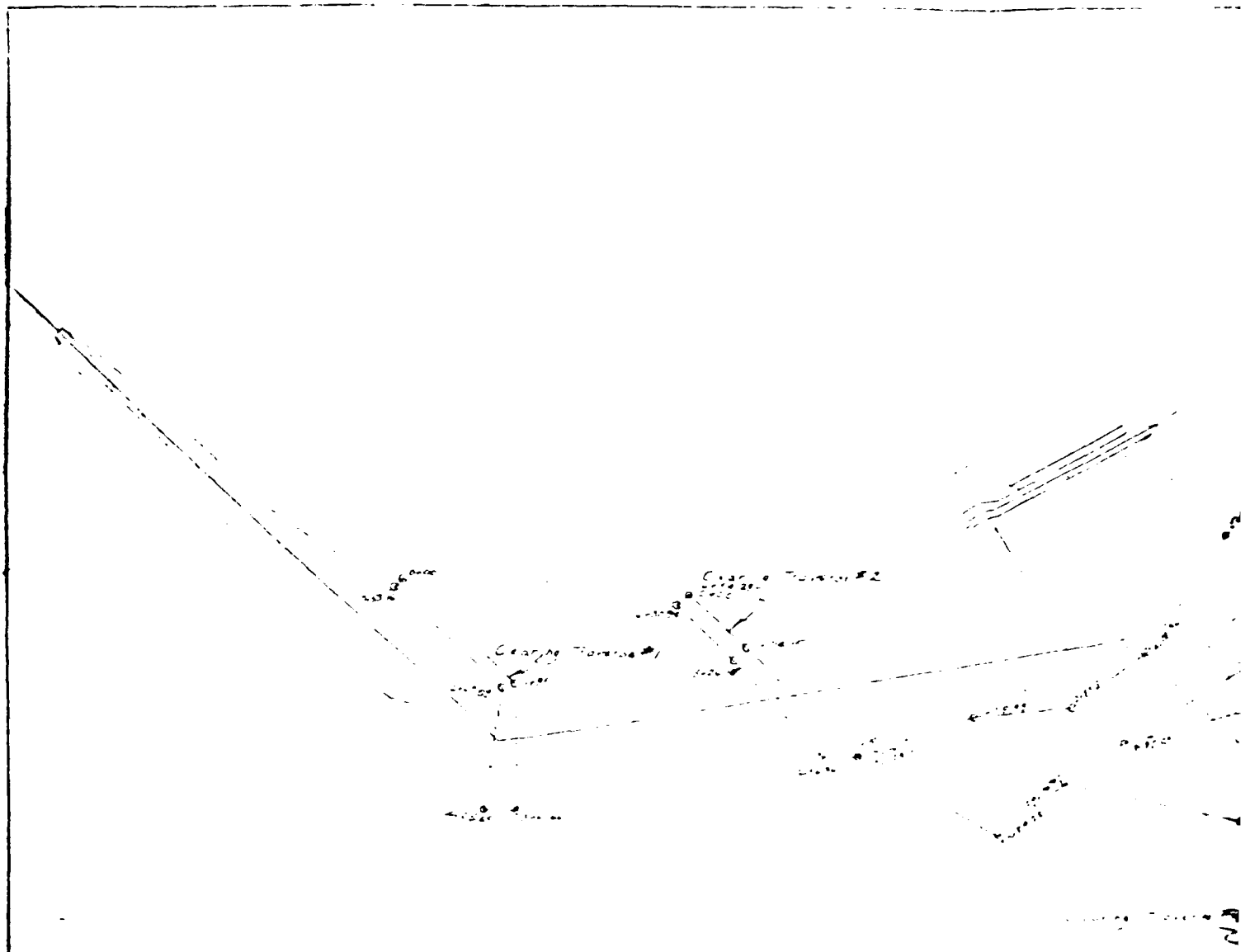
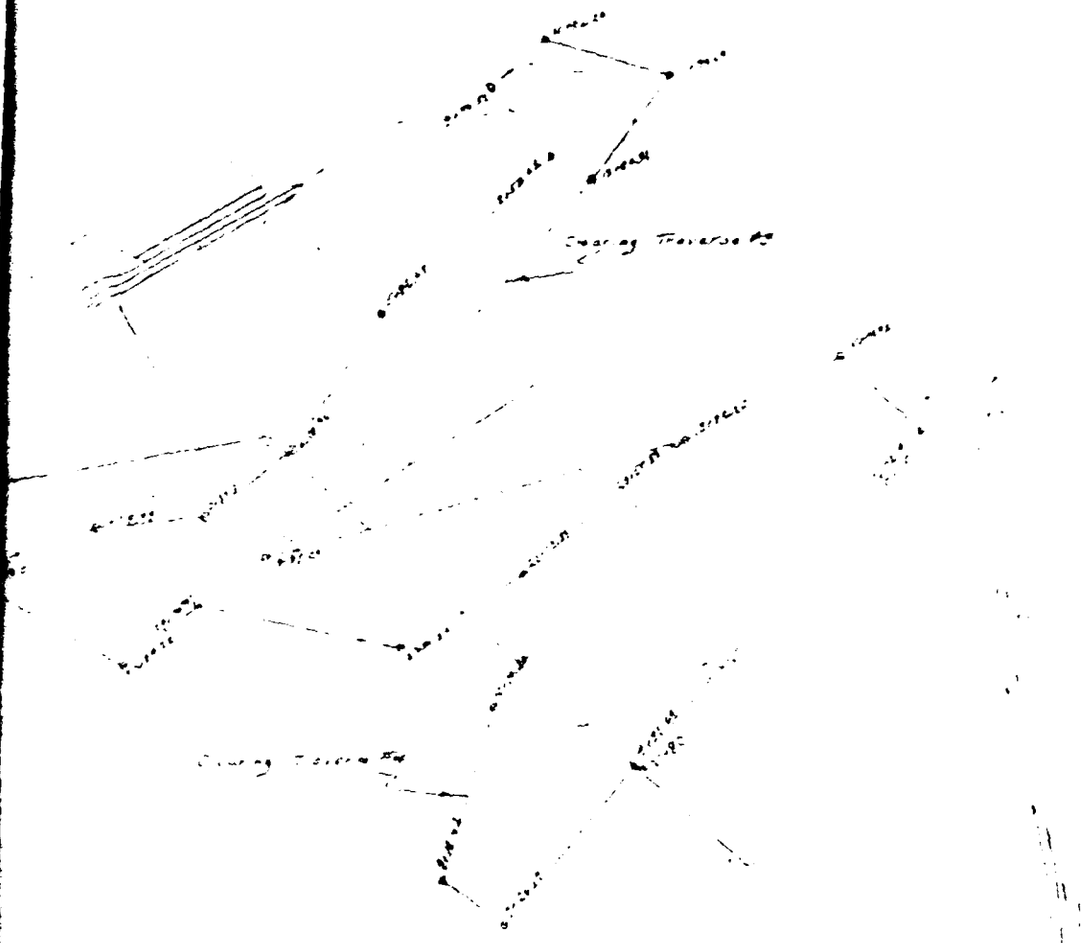
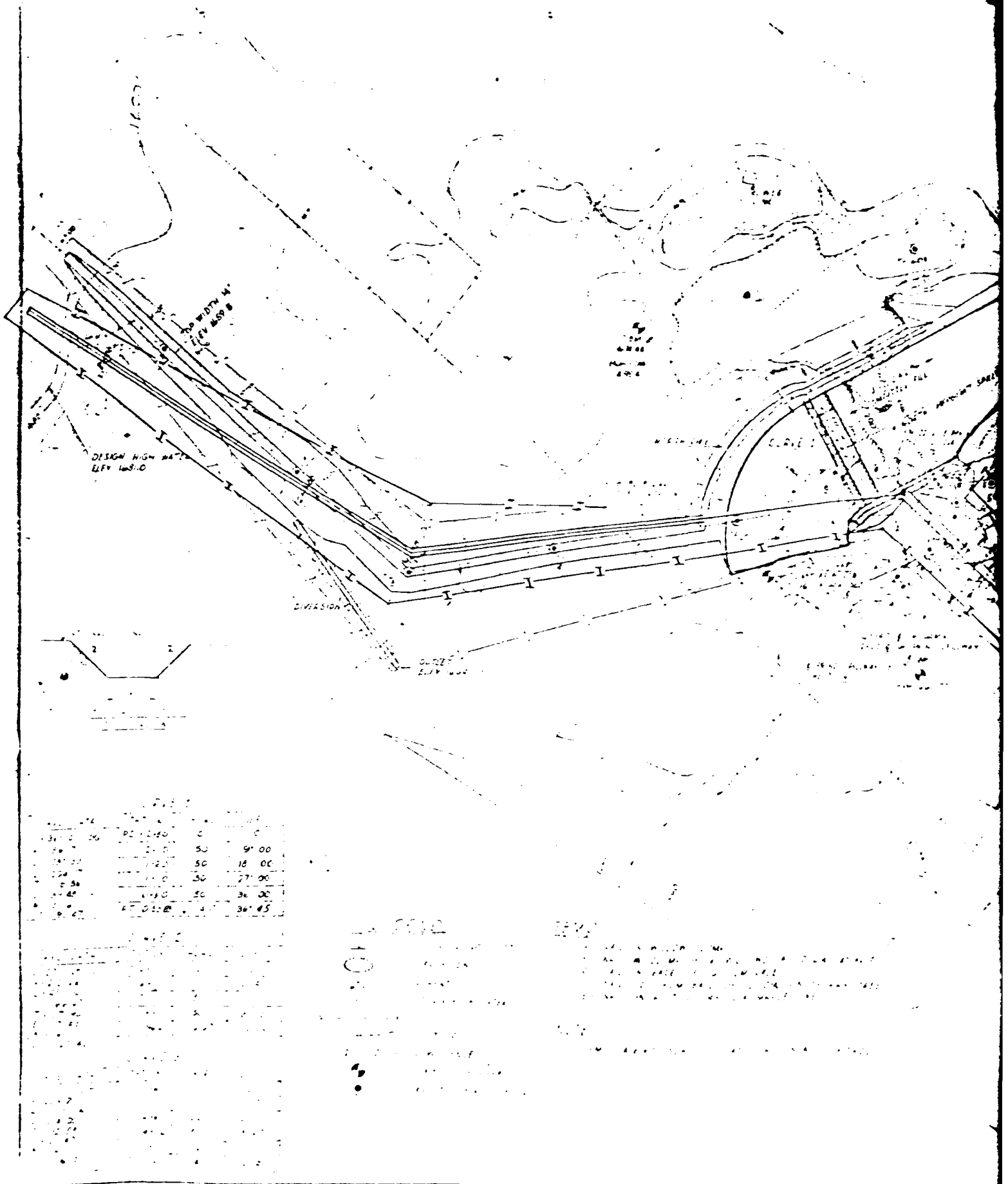
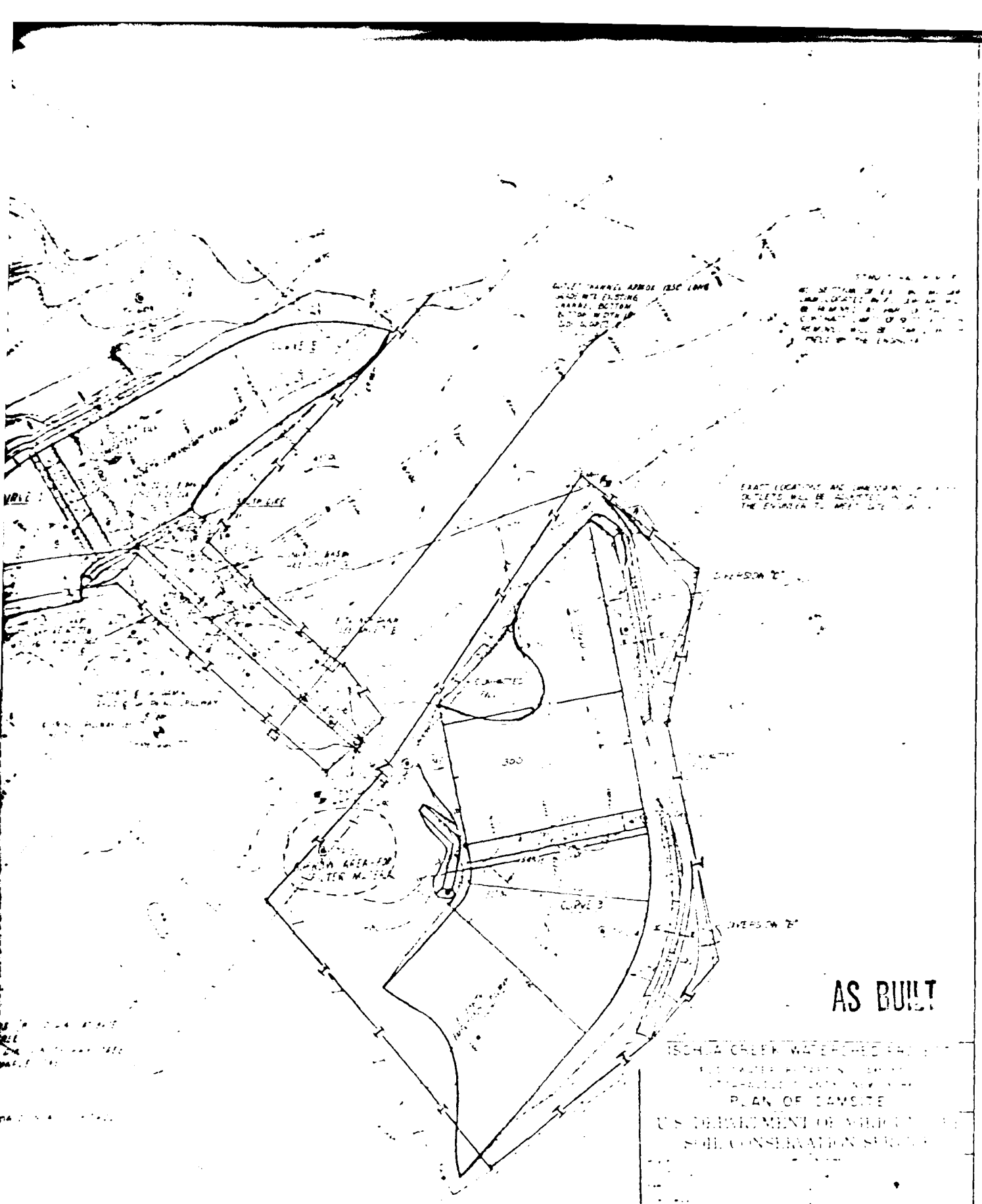





DESIGN HIGH WATER
DIVERSION
OUTLET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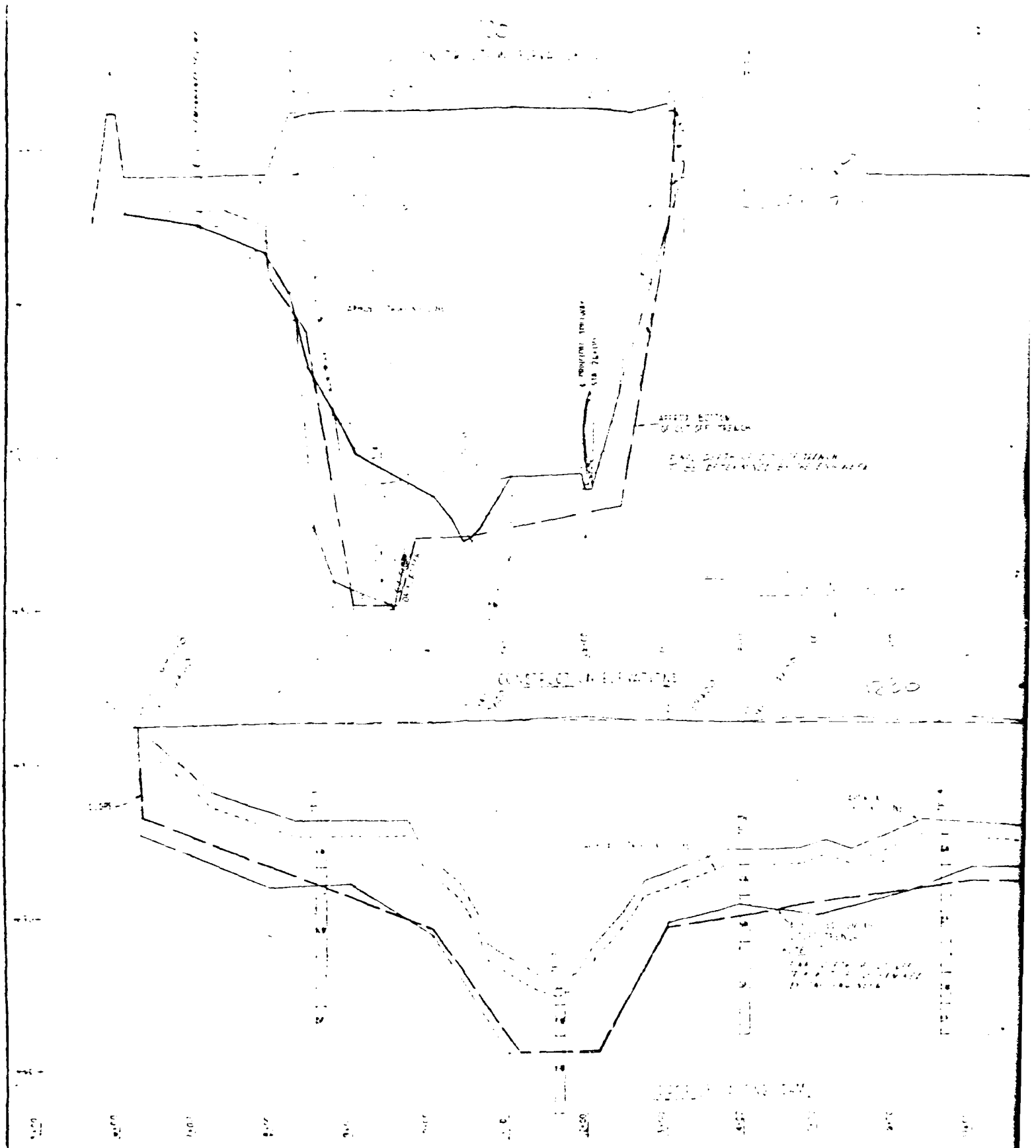
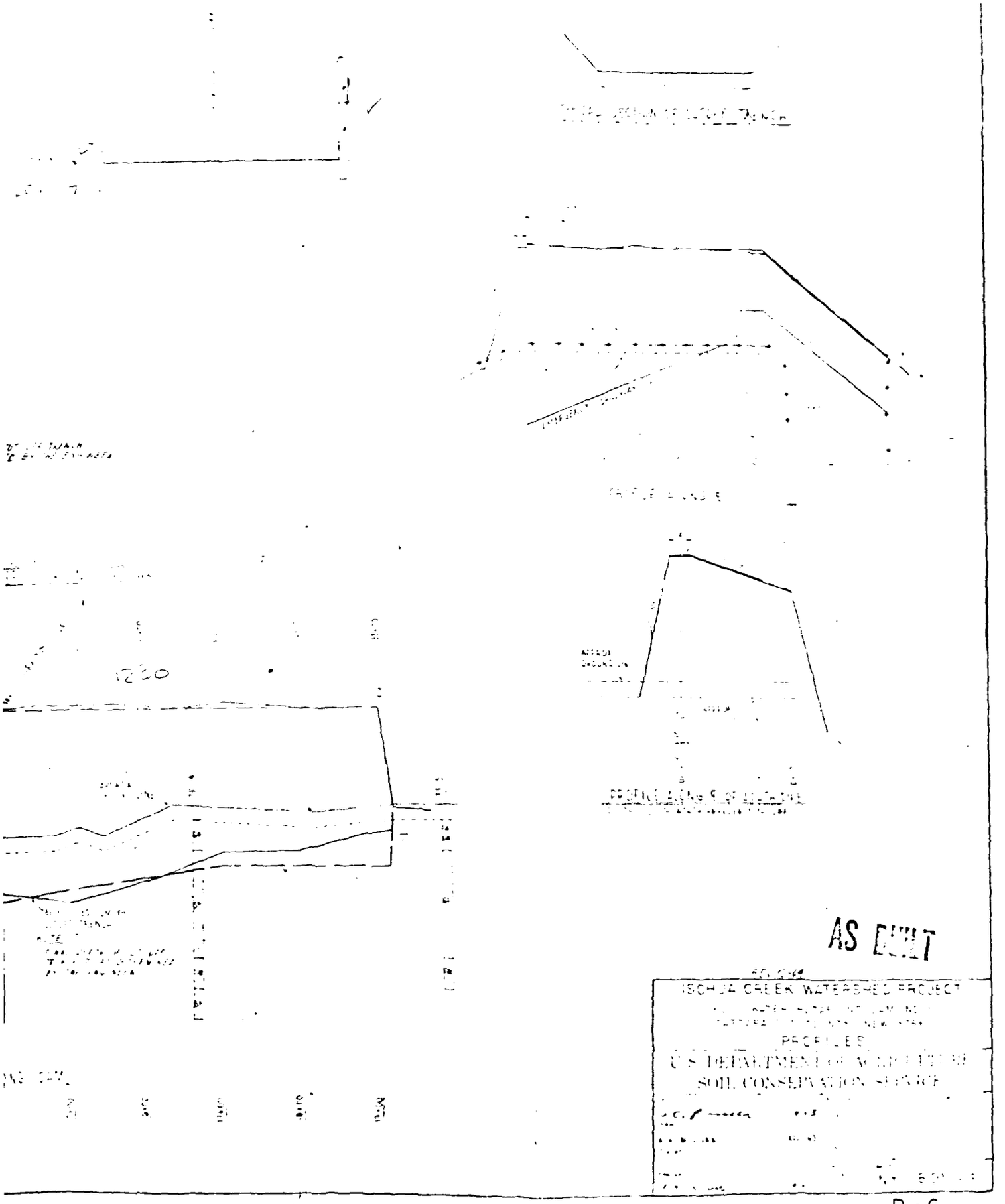
PLAN OF DAMSITE





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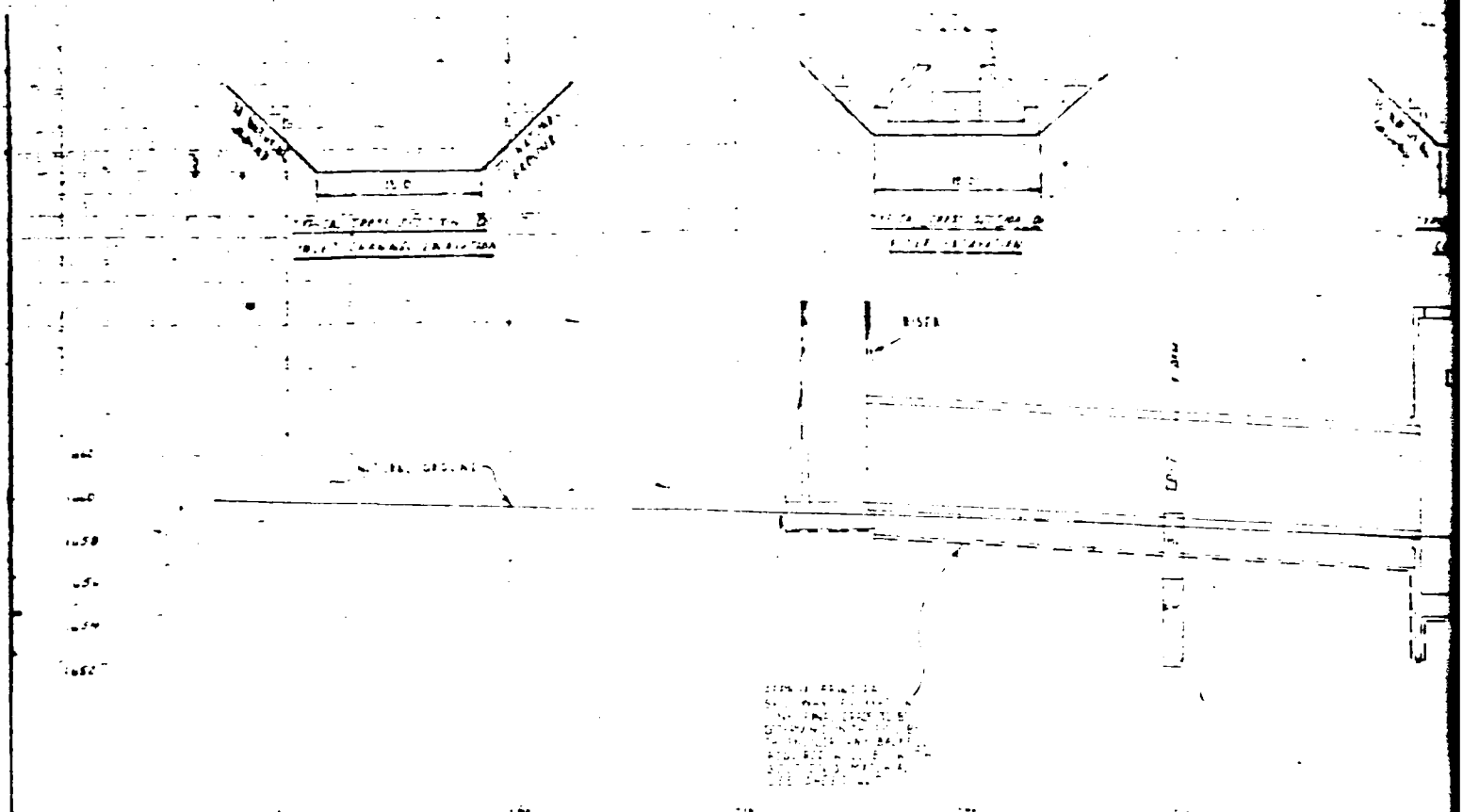
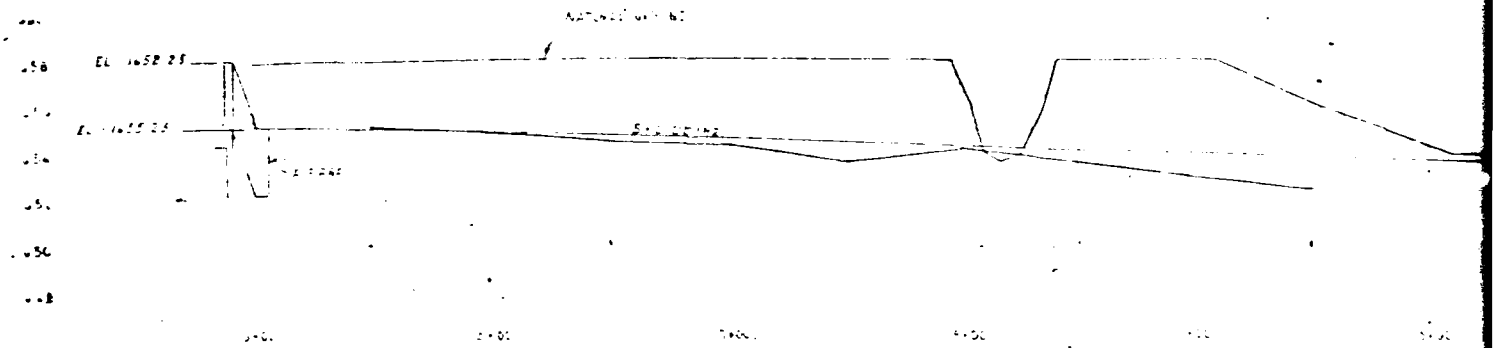
ISCHUA CREEK WATERSHED PROJECT

PROFILES

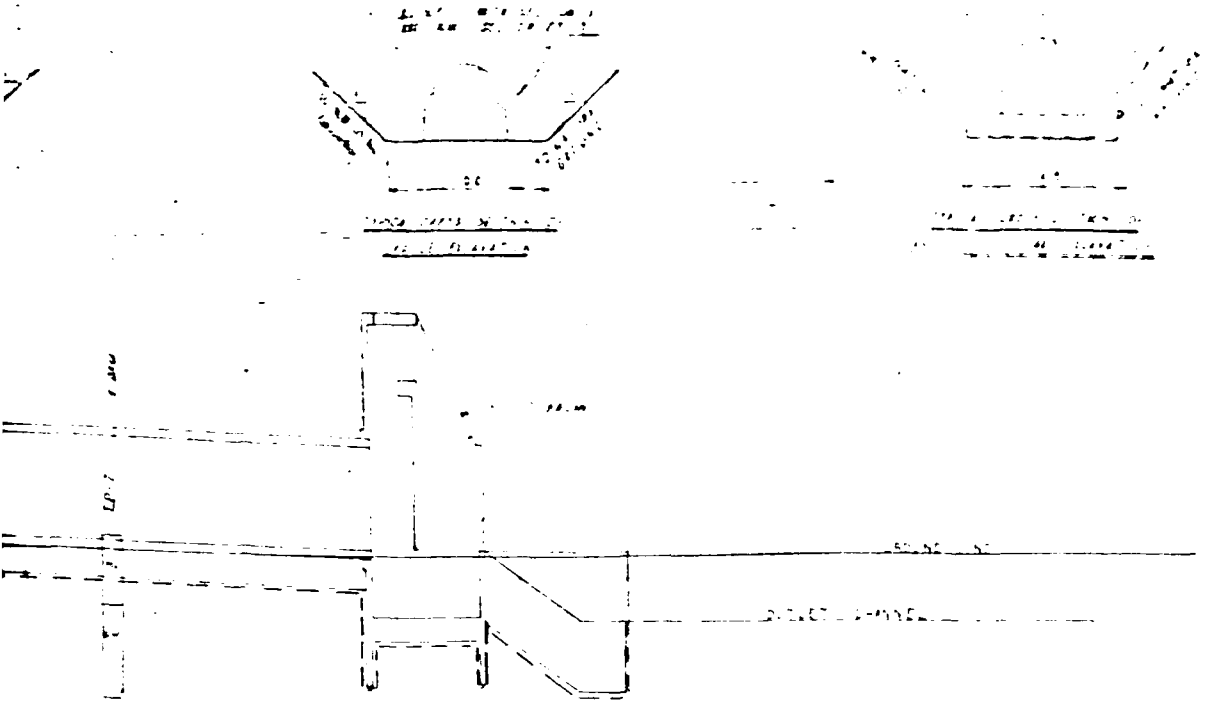
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

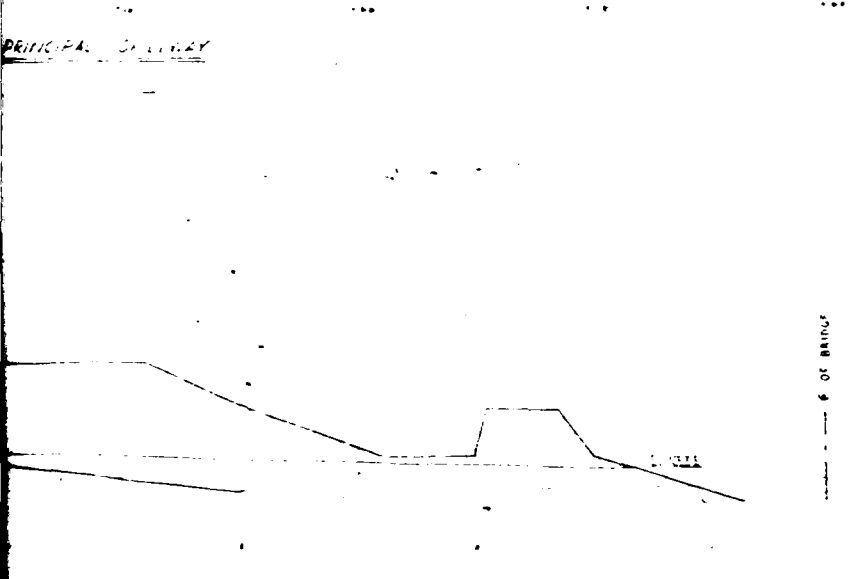


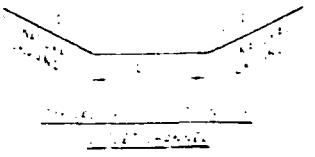
PROFILE ALONG ℄ OF PRINCIPAL SPILLWAY



PROFILE ALONG ℄ OF OUTLET CONDUIT







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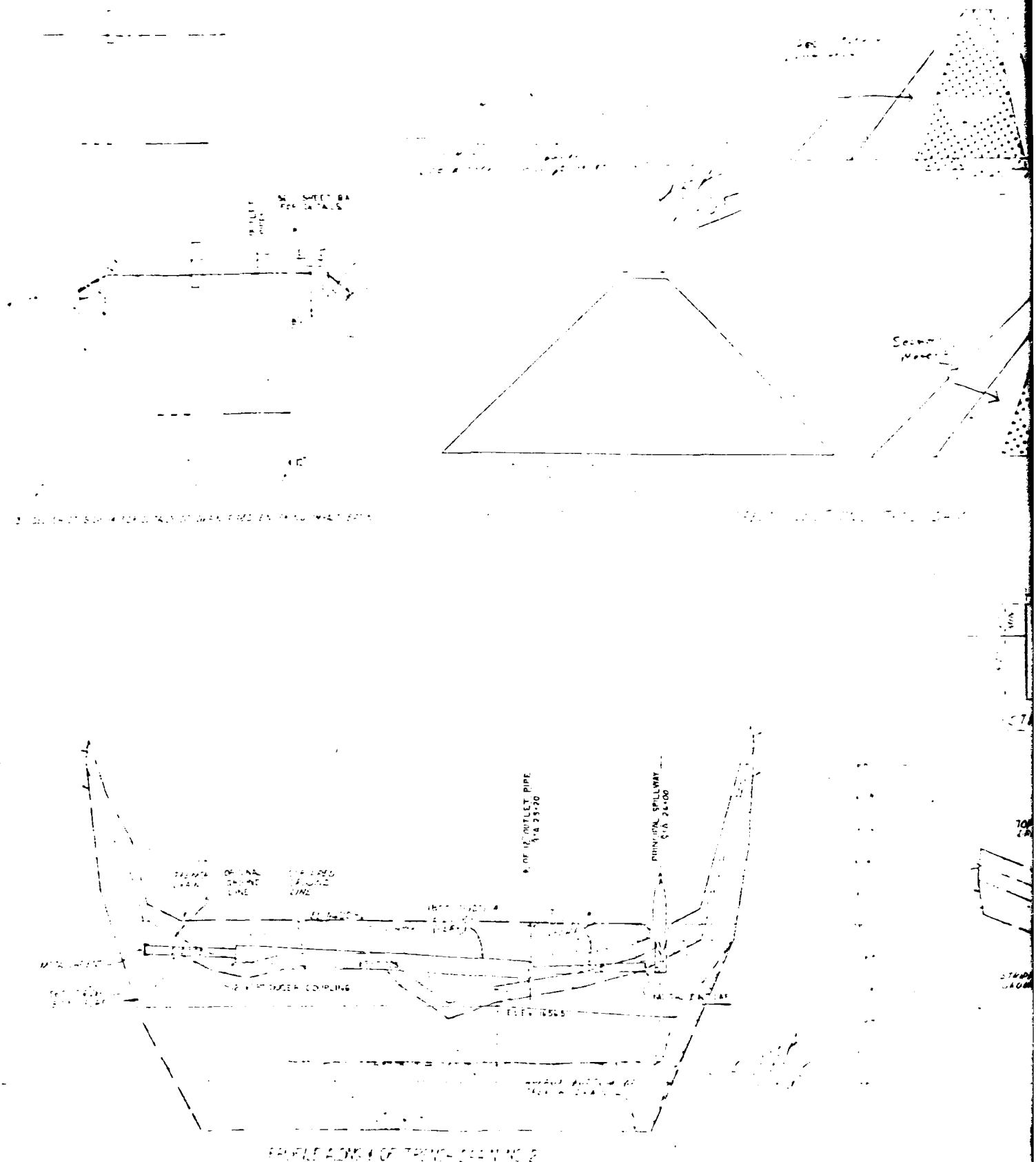
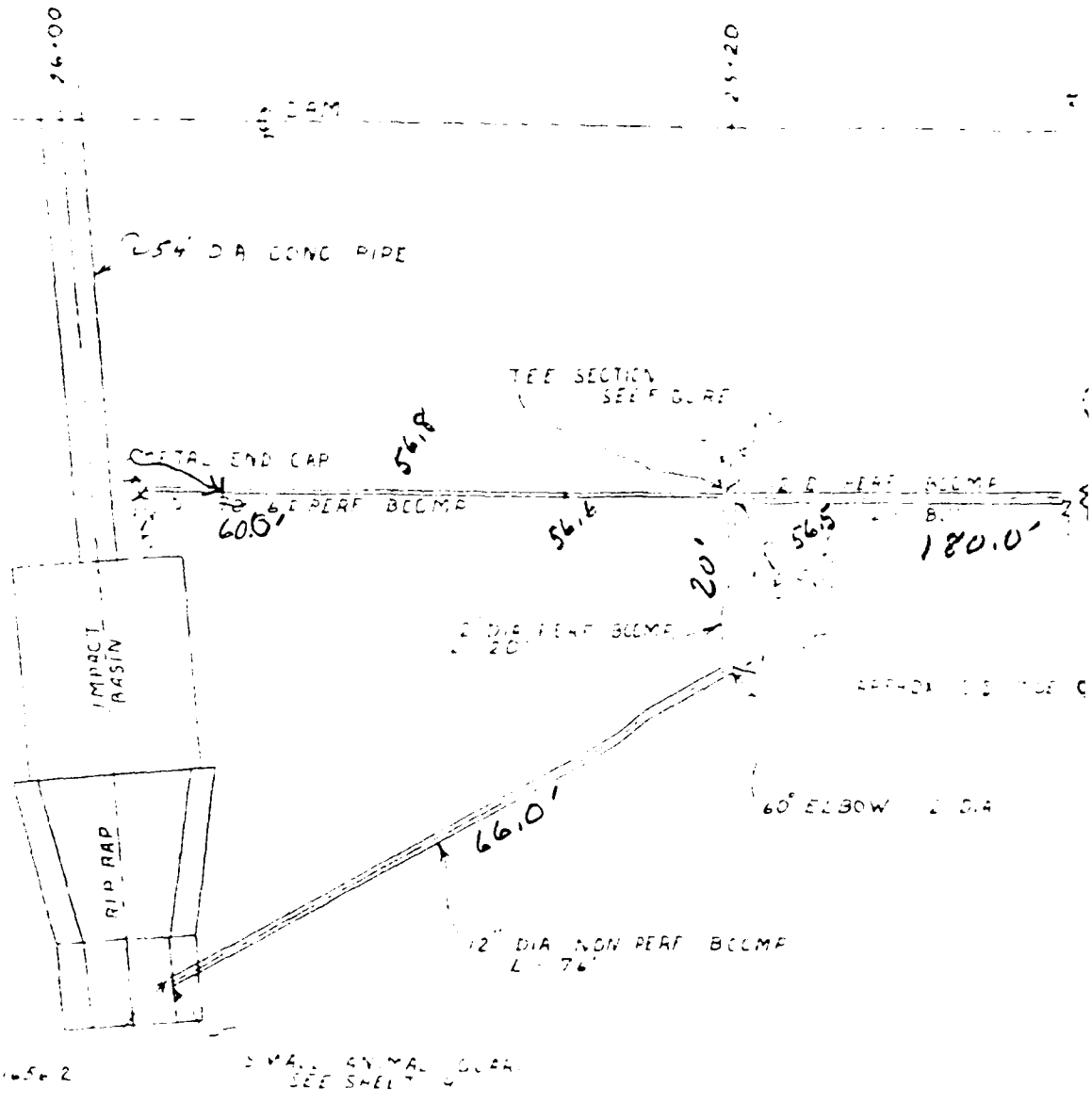
ISCHUA CREEK WATERSHED PROJECT
[illegible] WATER RETARDING DAM NO. [illegible]
CATTARAUGUS COUNTY, NEW YORK
PROFILES
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE


PRINCIPAL SPILLWAY
STA 24+00



LAYOUT OF FILTER DRAINAGE

SCHOOL CREEK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 1

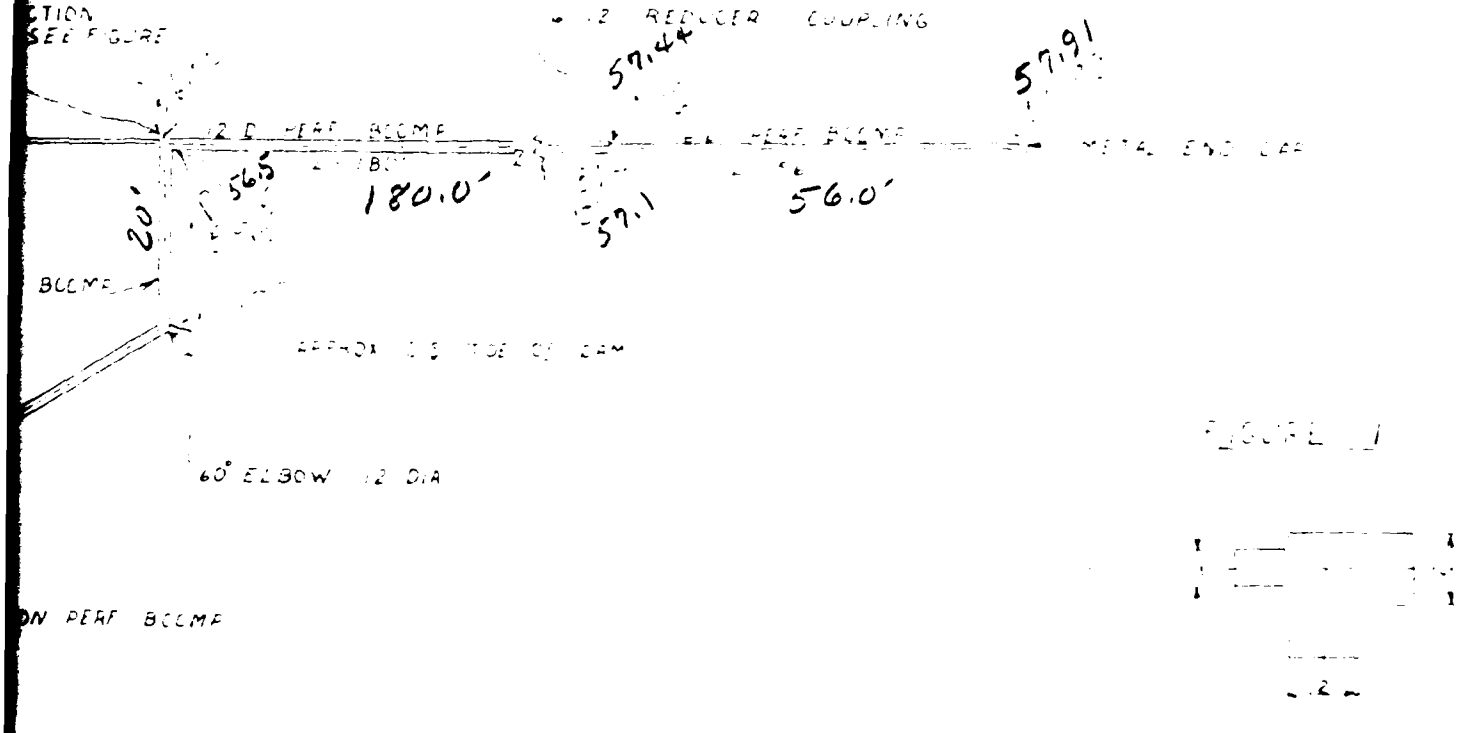
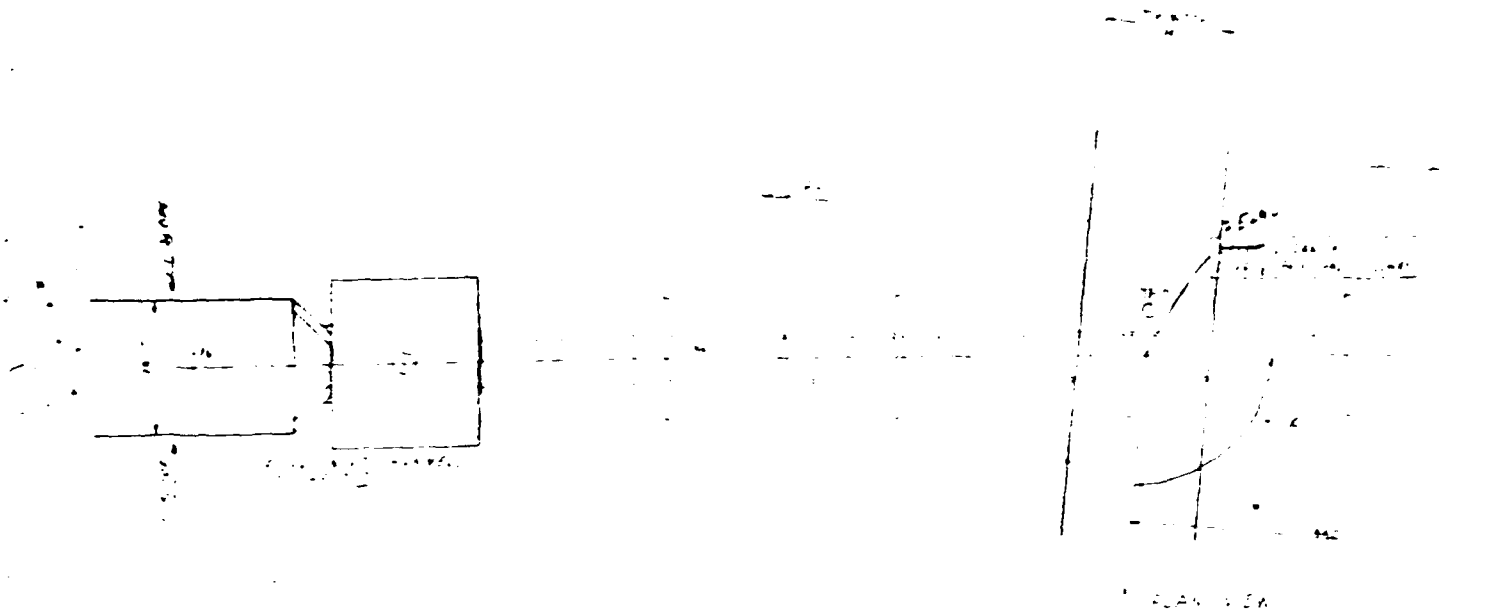
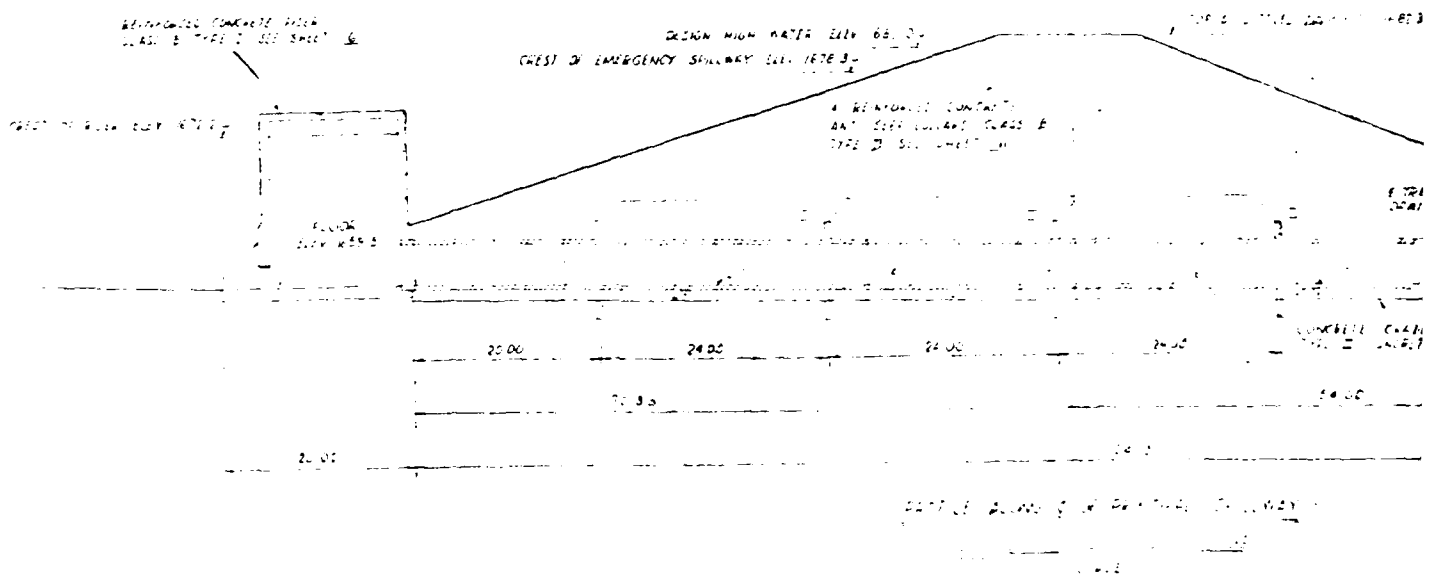
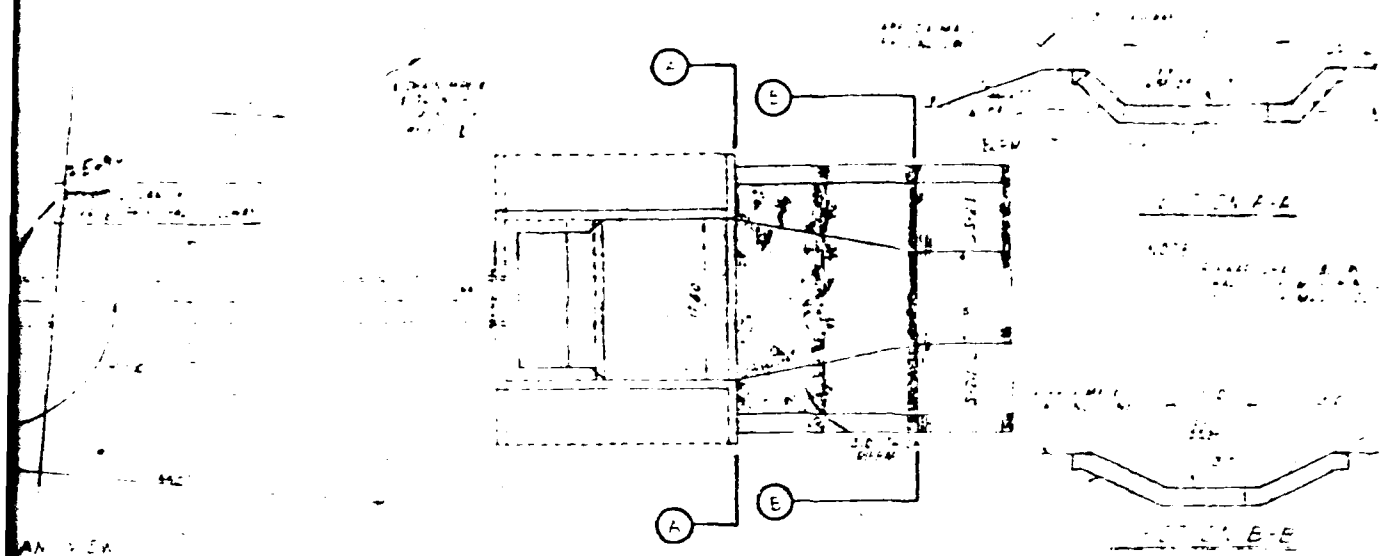
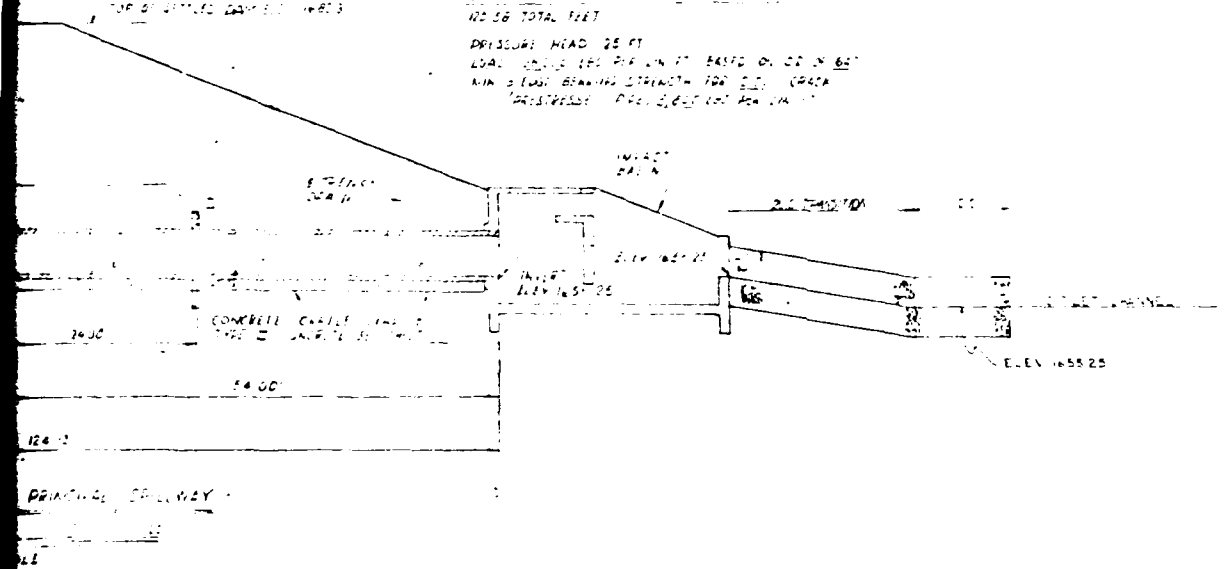

SEE FIGURE
REDUCER COUPLING
57.44
57.91
METAL END CAP
180.0'
56.0'
57.1
20'
60° ELBOW 12 DIA

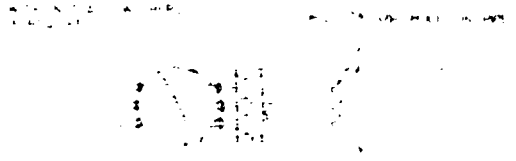
FIGURE 1



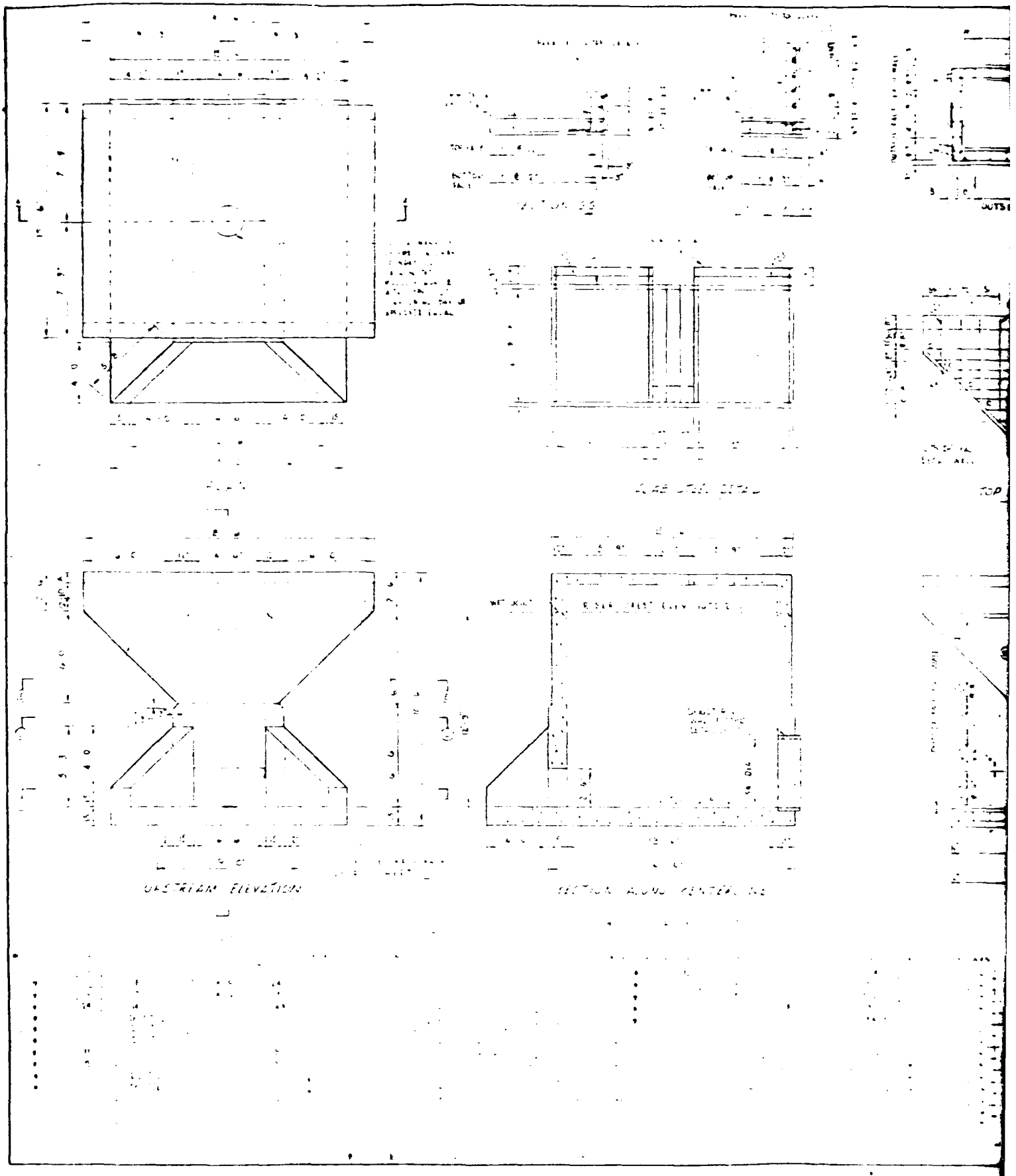

REINFORCED CONCRETE FILLER
DESIGN HIGH WATER ELEV
CREST OF EMERGENCY SPILLWAY ELEV
20.00
24.00
24.00
24.00

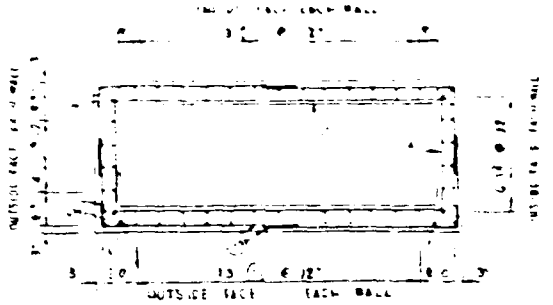




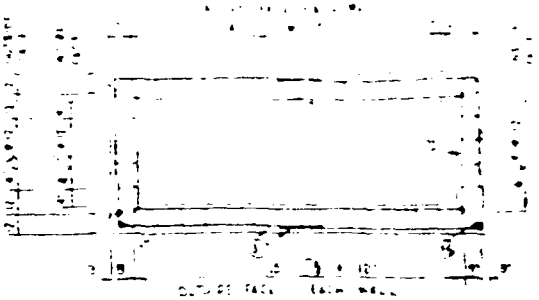


DETAIL OF SMALL ANIMAL GUARD

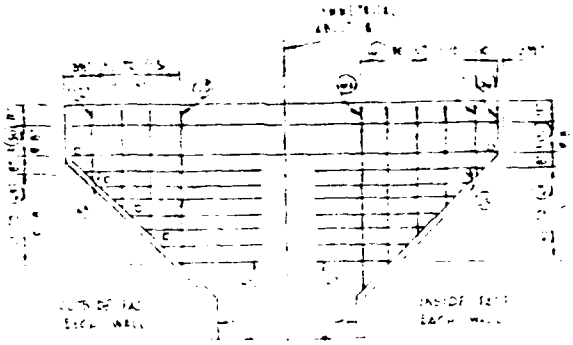




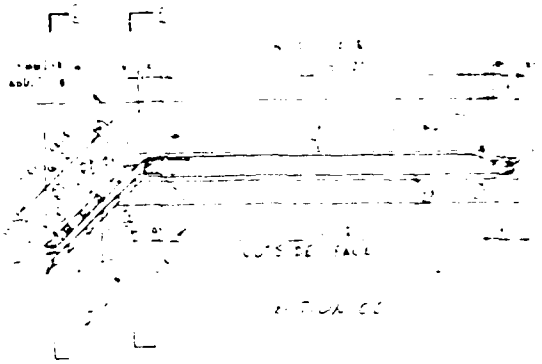
SECTION EE



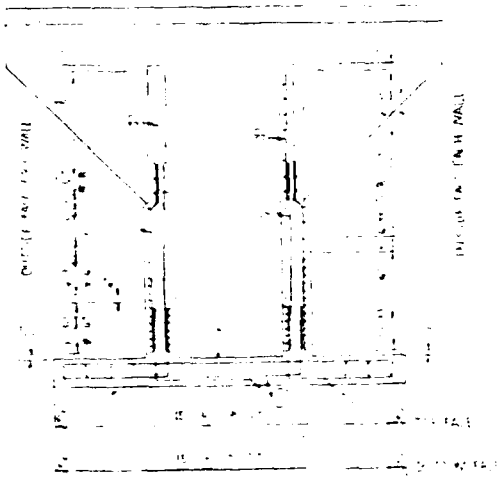
SECTION FF



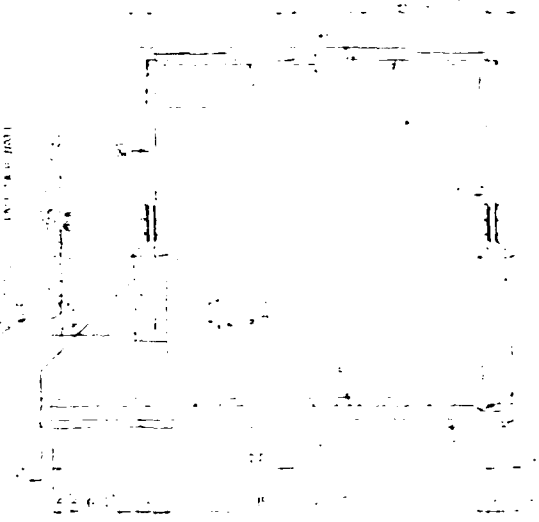
TOP SLAB SUPPORT STEEL DETAIL



SECTION GG



SECTION AA

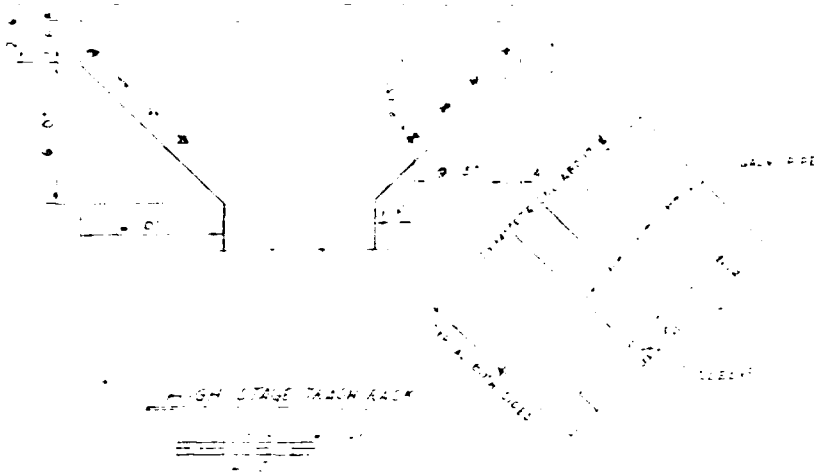


SECTION BB

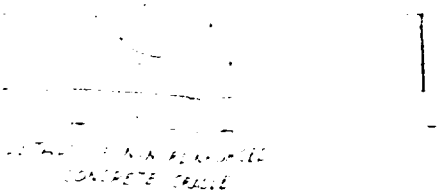
AS B

B-11

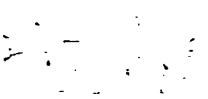
1 2



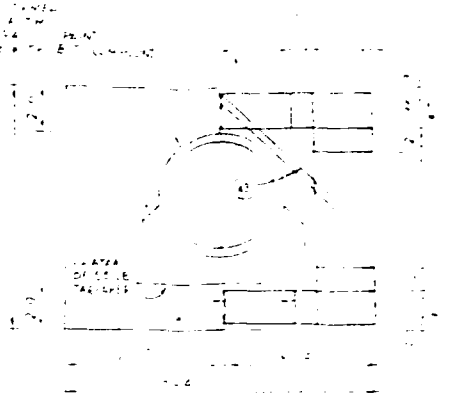
HIGH STAGE TRUSS RACK



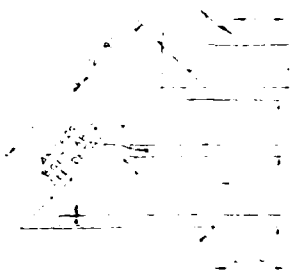
DETAILS OF REINFORCED CONCRETE CELLS



DETAILS OF ANCHOR BOLT SEE 2



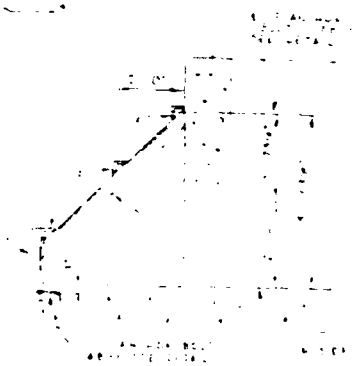
DETAILS OF REINFORCED CONCRETE AN



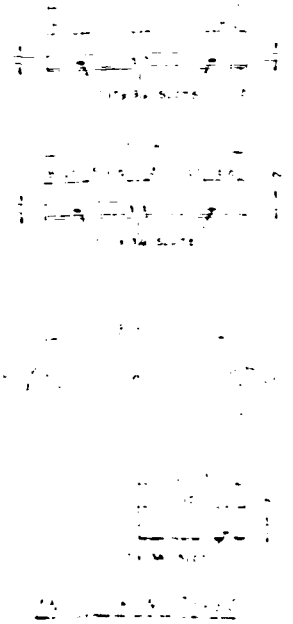
PLAN

DETAILS OF ANCHOR BOLT SEE 2

ELEVATION VIEW



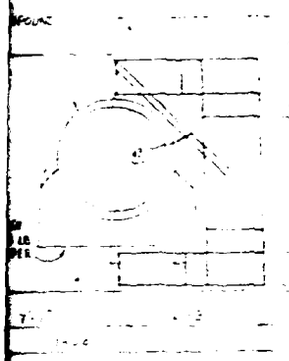
SECTION AA



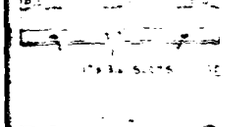
LOW STAGE TRUSS RACK DETAILS

...ON AS REVISED
...TE CIRCLE

...ON REINFORCED CONCRETE DETAILS



...LS OF REINFORCED CONCRETE A.V.T. SEEP COLLAR



CLASS THIS SHEET ONLY

STEEL QUAN. CONCRETE QUAN.

No. 4 BARS ... LBS CLASS "B" TYPE II ... CU. YDS.

TOTAL ... LBS

GENERAL NOTES

ALL CONCRETE SHALL BE CLASS B AND AS PER THIS NOTES

VERTICAL CEMENT TYPE II OR TYPE I WITH AN ADDITION OF ...

ADMIXTURE SHALL BE USED

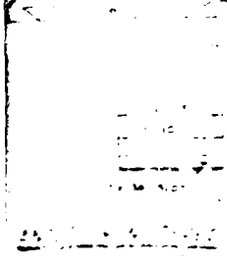
ALL REINFORCING STEEL BARS IN CONCRETE SHALL AGAINST THE GROUND SHALL HAVE A MIN OF 3 CLEAR COVER WHERE FORMS ARE USED ALL BARS SHALL HAVE A MIN OF 2 CLEAR COVER

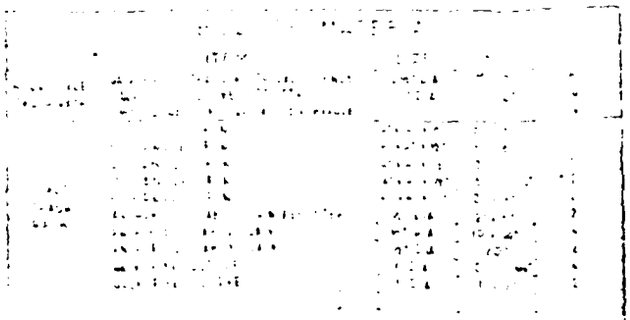
ALL BENDS SHALL BE ... AS SHOWN

ALL STIRRUPS SHALL BE ... AS SHOWN

DETAIL OF ...

'AS BUIL

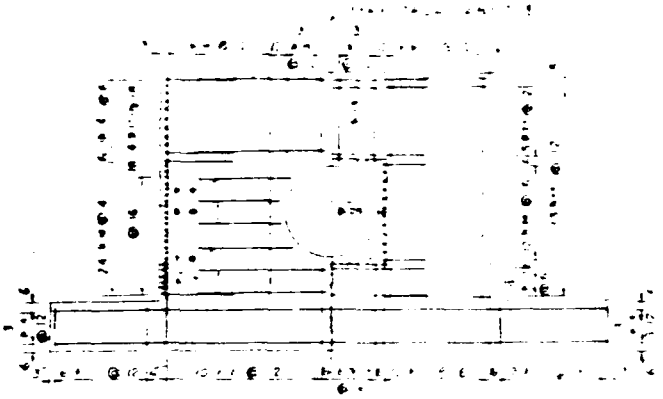


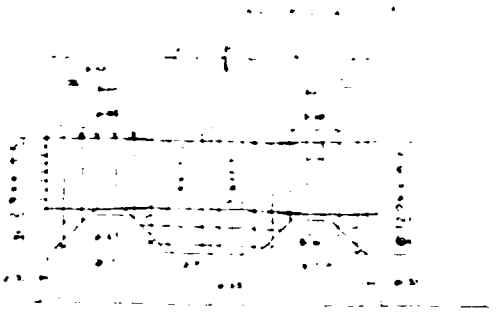


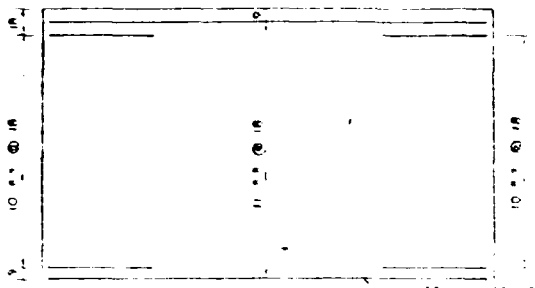
SCHLA CREEK WATERSHED PROJECT

COLLAR-CRADLE-TRASH RACK & WEIR

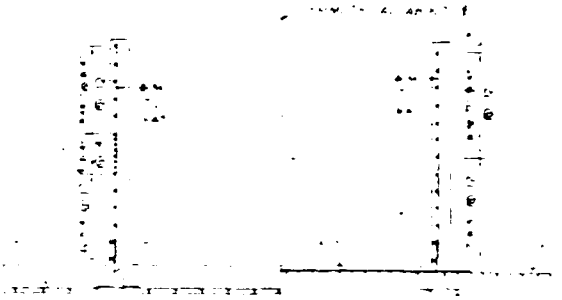
B-12

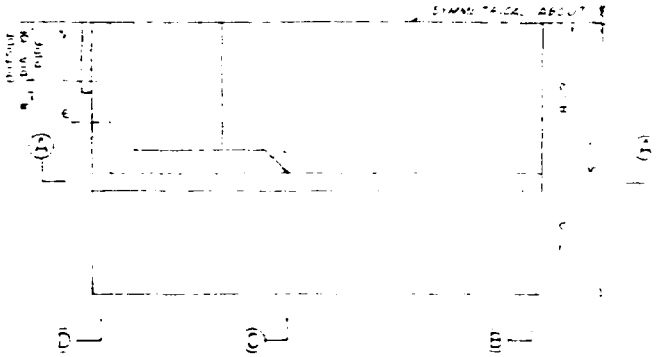




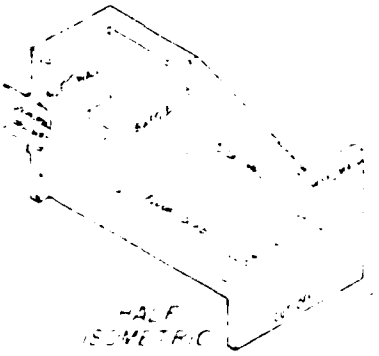


PLAN OF FLOOR SLAB BOTTOM FACE

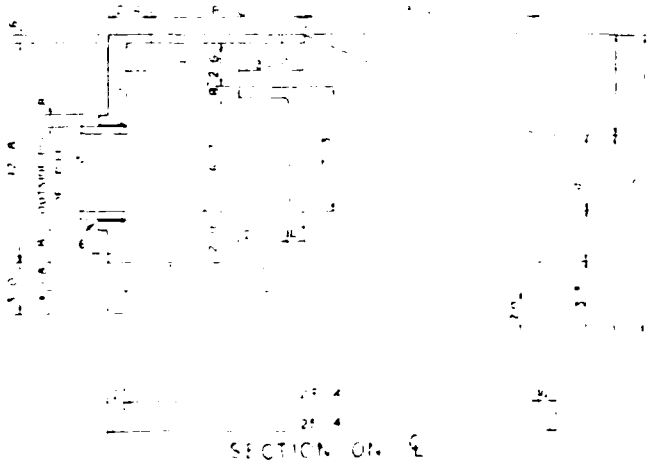




PLAN VIEW



HALF ISOMETRIC

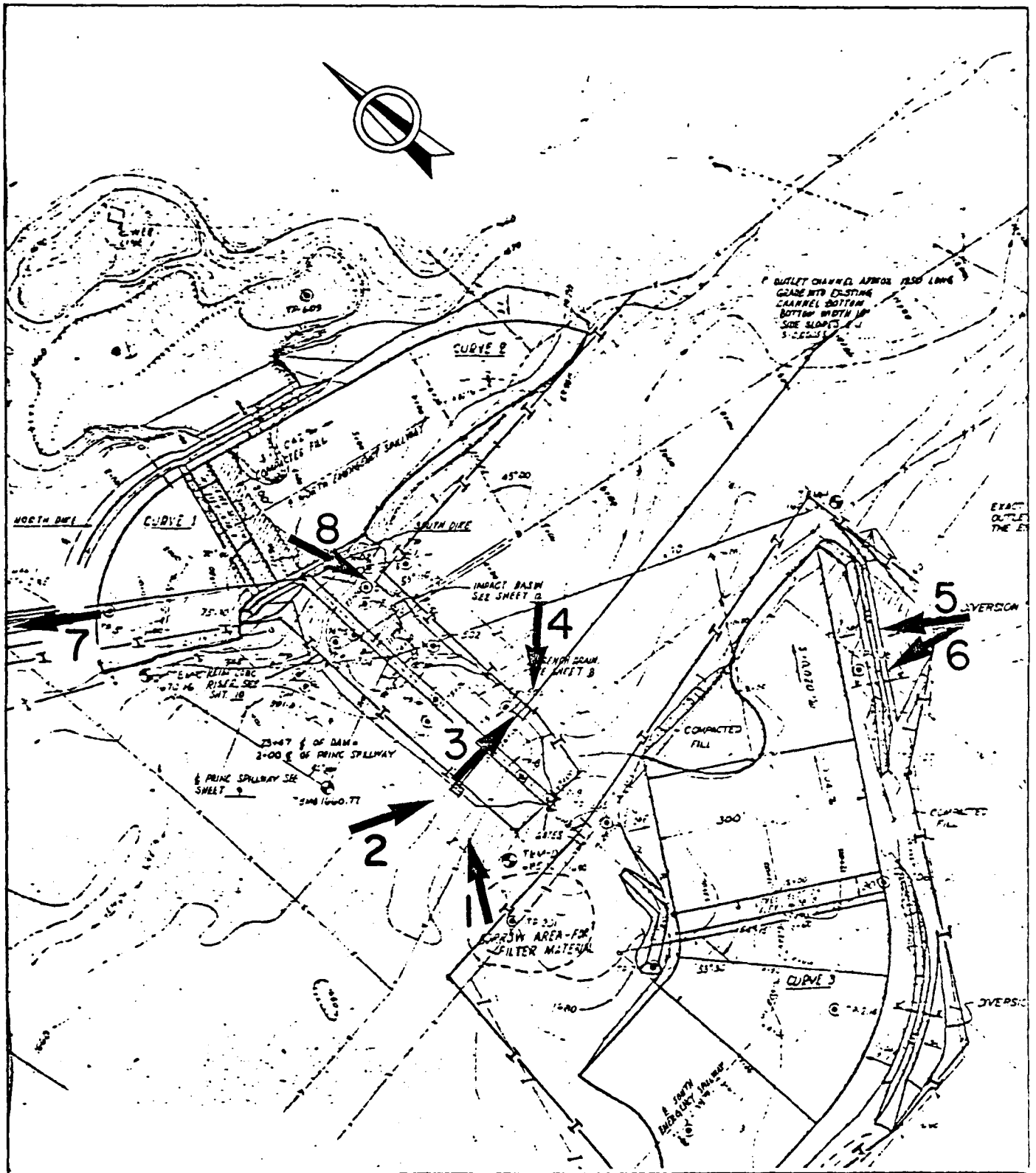


SECTION ON ℄

SECTION B-B
SECTION A-A
SECTION A-A
AS BUILT

APPENDIX C

PHOTOGRAPHS

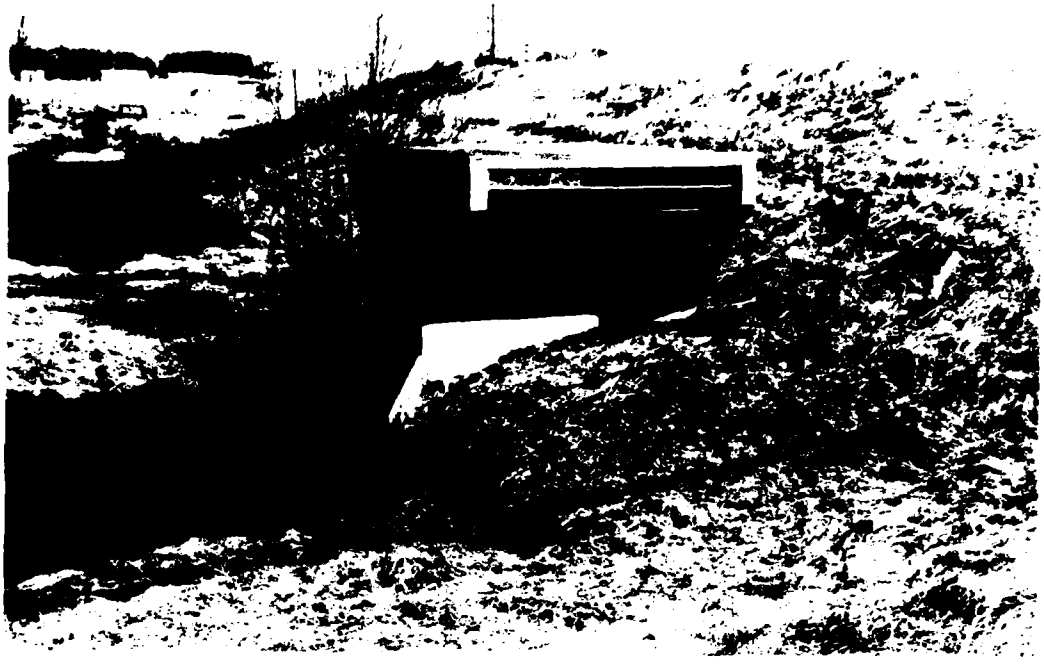


ISCHUA CREEK WATERSHED DAM #1

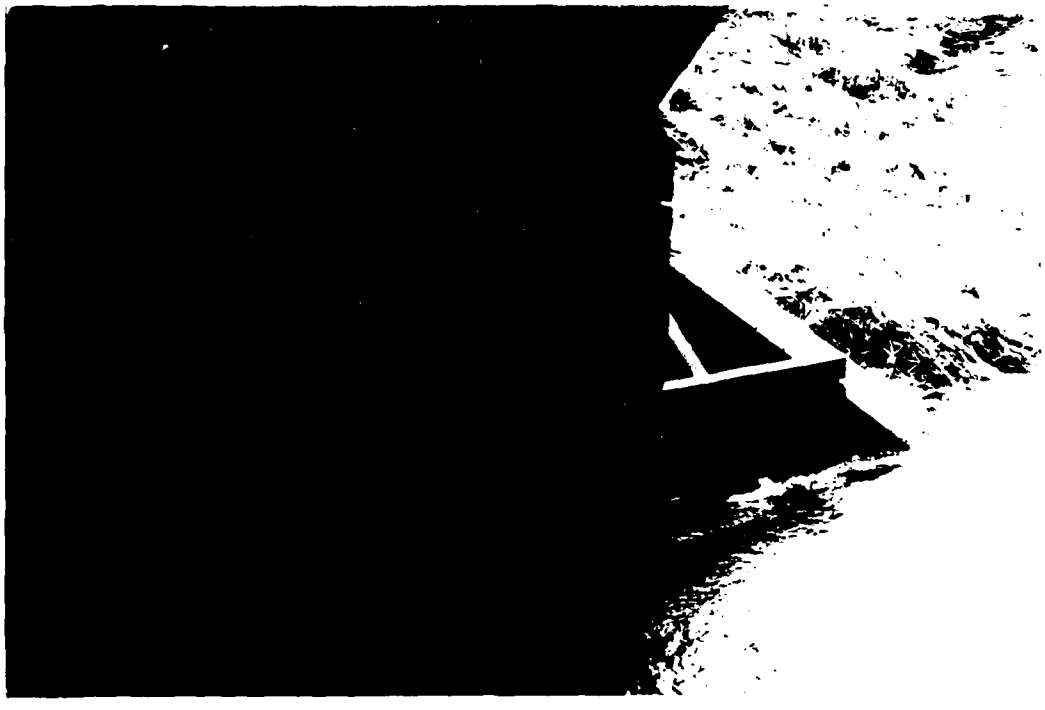
NY00583

PHOTO ORIENTATION PLAN

ENDMAN, ANTHONY, ASSOCIATES CONSULTING ENGINEERS & PLANNERS	DATE MAY 1981	C-1



1. Principle spillway inlet structure. Note trees.

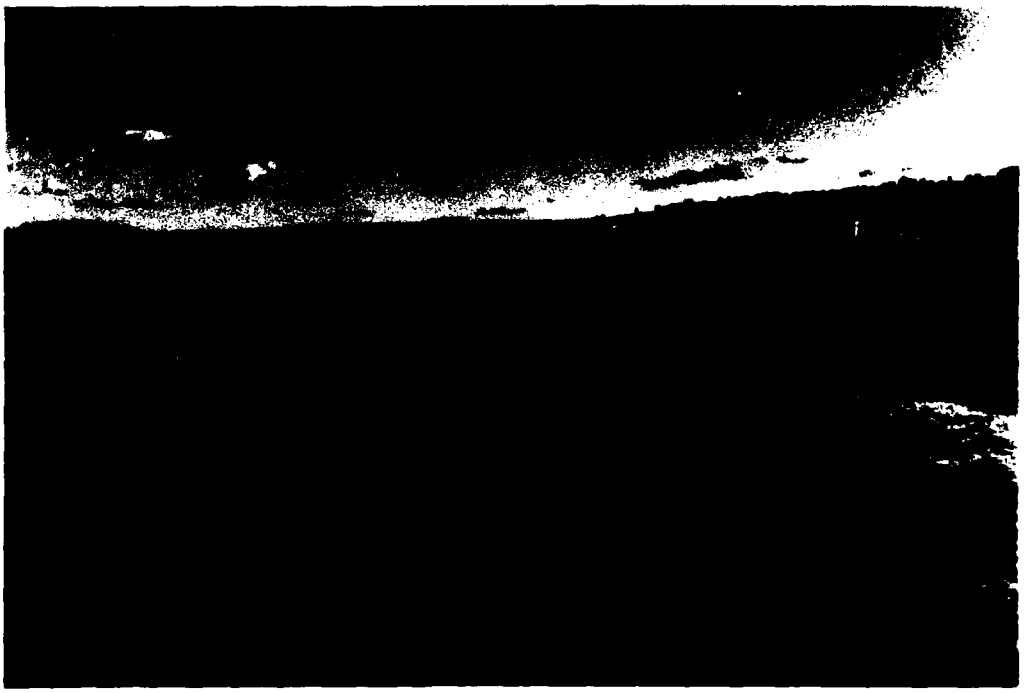


2. Principle spillway low stage inlet structure showing trash rack.

3. Downstream channel.

4. Principle spillway impact basin.

5. Downstream face of dam.



6. South emergency spillway.

7. Crest of dike.

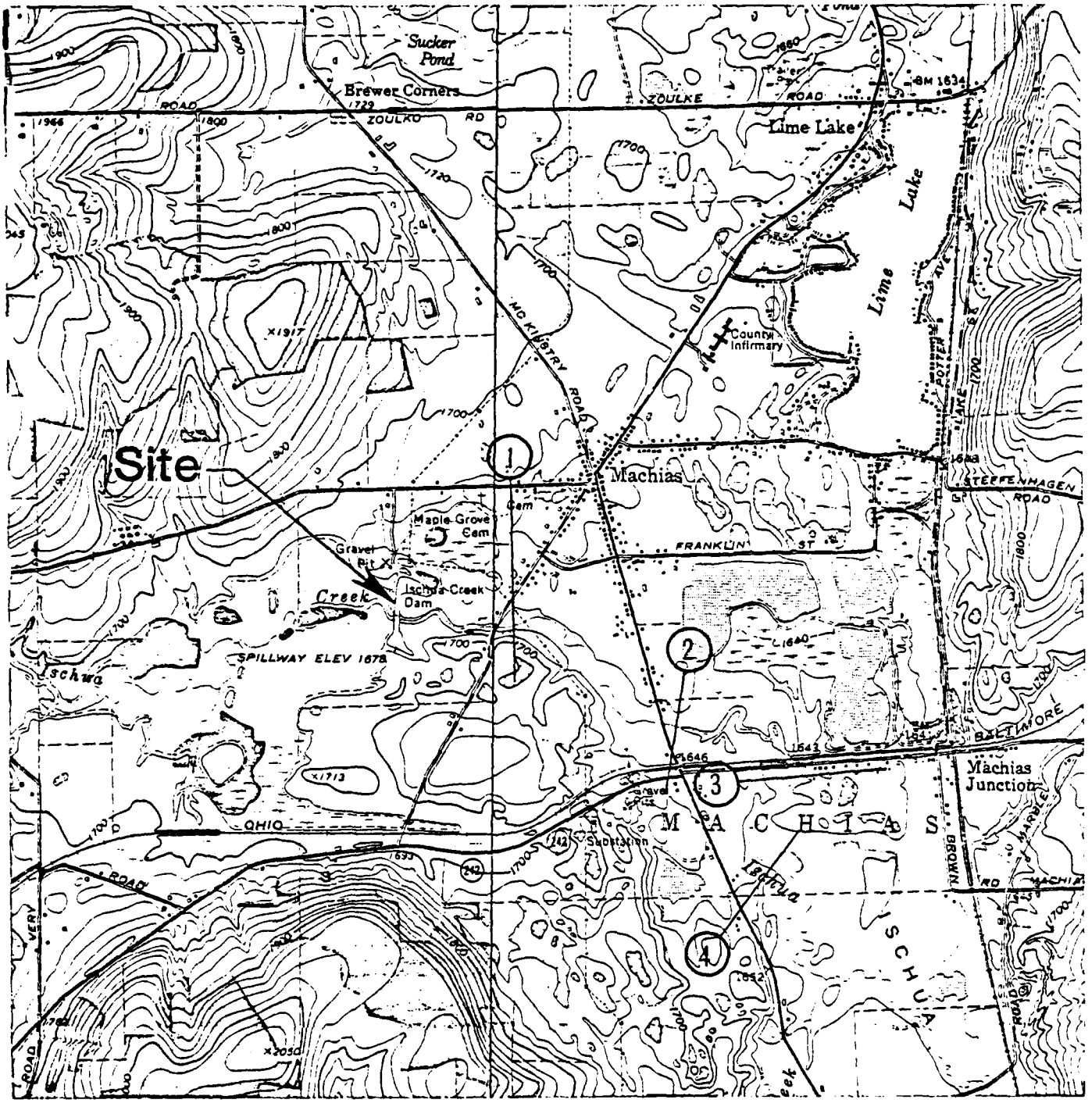
8. Downstream face of dam. Note rutting and trees.

APPENDIX D

HYDRAULIC AND HYDROLOGIC COMPUTATIONS

APPENDIX D

	PAGE
Cross Section Location Plan	D-2
HEC-1 Dam Safety Version Computer Program - Input	D-3
HEC-1 Dam Safety Version Computer Program - Output	D-4
Supporting Calculations	
• Hydrology	D-12
• Spillway Hydraulics	D-14
• Downstream Channel Routing	D-25



Ischua Creek Watershed
Dam No. 1

CROSS SECTION LOCATION PLAN

Scale: 1"=2000'

D-2

```
A1       ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF                DAM NY 583
A2       HYCROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF ISCHUA CREEK DAM NO. 1
A3       RATIOS OF PMF ROUTED THROUGH THE RESERVOIR AND DOWNSTREAM
B     100        0       30                                    0      -1        4
B1      5
J       1        6        1
J1    0.2      0.4      0.5      0.6      0.8      1.0
K       0  INFLOW                          0        0        1
K1       CALCULATION OF INFLOW HYDROGRAPH TO RESERVOIR
M       1        1     13.1             13.1        0                          1
P       0     22.4      112      122      136      146
T                                                  1.0      0.1                  0
V     6.0     0.50
X     2.0     -.10      2.0
K       1 OUTFLOW                                    1
K1       CALCULATION OF OUTFLOW HYDROGRAPH FROM RESERVOIR
Y                                  1        1
Y1      1                                          -1672.2     -1
YA1672.2     1674     1676   1678.3     1679     1680     1681     1682   1682.3     1683
YA   1684     1685
Y5    197      260      340      416     1344     3917     7443    11665    13135    16704
Y5  22149    28264
$S    933     2318     3068     3648
$E1672.2   1678.3     1681   1682.3
$$1678.3
$D1682.3      2.7      1.5     1720
K       1        1
K1     CHANNEL ROUTING -MOD PULS RESERVOIR -1
Y                                  1        1
Y1      1
Y6    .05      .04      .05     1650     1680     1600   0.0050
Y7      0     1680     1000     1660     1279   1653.5     1280     1650     1320     1650
Y7   1321   1653.5     1400     1660     1475     1680
K       1        2                                    1
K1     CHANNEL ROUTING -MOD PULS REACH 1-2
Y                                  1        1
Y1      1
Y6    .08      .04      .08     1640     1660     3300   0.0030
Y7      0     1660      224   1643.5      225     1640      275     1640      276   1643.5
Y7    800     1660      801     1660      802     1660
K       1        3
K1     CHANNEL ROUTING -MOD PULS REACH 2-3
Y                                  1        1
Y1      1
Y6    .04      .04      .08     1638     1660     1900   0.0010
Y7      0     1660      300   1641.5      494   1641.5      495     1638      525     1638
Y7    526   1641.5      900   1641.5     1200     1660
K       1        4                                    1
K1     CHANNEL ROUTING -MOD PULS REACH 3-4
Y                                  1        1
Y1      1
Y6    .04      .04      .08     1635     1650     1700   0.0020
Y7      0     1650      250     1640      859   1638.5      860     1635      890     1635
Y7    891   1638.5     1025     1640     1200     1650
K      99
```

```
OK, SEG $HEC1DB
ENTER PROJECT NUMBER
80166-00.04
INPUT FILE ? NY583
1*********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978
   LAST MODIFICATION  26 FEB 79
 *********************************
1                          PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS
                                   RUNOFF HYDROGRAPH AT      INFLOW
                                   ROUTE HYDROGRAPH TO       OUTFLOW
                                   ROUTE HYDROGRAPH TO            1
                                   ROUTE HYDROGRAPH TO            2
                                   ROUTE HYDROGRAPH TO            3
                                   ROUTE HYDROGRAPH TO            4
                                   END OF NETWORK

1*********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978
   LAST MODIFICATION  26 FEB 79
 *********************************

 RUN  DATE: 4/29/
      TIME: 1:19 PM
```

D-4

ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF — DAM NY 583
HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF ISCHUA CREEK DAM NO. 1
RATIOS OF PMF ROUTED THROUGH THE RESERVOIR AND DOWNSTREAM

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
100	0	30	0	0	0	0	-1	4	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 6 LRTIO= 1

RTIOS= 0.20 0.40 0.50 0.60 0.80 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

CALCULATION OF INFLOW HYDROGRAPH TO RESERVOIR

	ISTAQ	ICOMP	ICON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
INFLOW		0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	13.10	0.00	13.10	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.40	112.00	122.00	136.00	146.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.809

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 6.00 CP=0.50 NTA= 0

RECESSION DATA

STRTQ= 2.00 QRCSN= -0.10 RTIOR= 2.00

UNIT HYDROGRAPH 93 END-OF-PERIOD ORDINATES, LAG= 6.03 HOURS, CP= 0.50 VOL= 1.00

16.	60.	122.	197.	275.	369.	460.	545.	615.	669.
706.	725.	716.	682.	641.	603.	567.	533.	501.	471.
443.	417.	392.	368.	346.	326.	306.	288.	271.	255.
239.	225.	212.	199.	187.	176.	165.	156.	146.	138.
129.	122.	114.	107.	101.	95.	89.	84.	79.	74.
70.	66.	62.	58.	55.	51.	48.	45.	43.	40.
38.	35.	33.	31.	29.	28.	26.	25.	23.	22.
20.	19.	18.	17.	16.	15.	14.	13.	12.	12.
11.	10.	10.	9.	9.	8.	8.	7.	7.	6.
6.	6.	5.							

END-OF-PERIOD FLOW

0 MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	26.47	22.72	3.75	236451.
										(672.)(577.)(95.)(6695.54)			

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

CALCULATION OF OUTFLOW HYDROGRAPH FROM RESERVOIR

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
OUTFLOW	1	0	0	0	0	1	0	0

ROUTING DA

OLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1672.	-1

STAGE	1672.20	1674.00	1676.00	1678.30	1679.00	1680.00	1681.00	1682.00	1682.30	1683.00
	1684.00	1685.00								
FLOW	197.00	260.00	340.00	416.00	1344.00	3917.00	7443.00	11665.00	13135.00	16704.00
	22149.00	28264.00								

CAPACITY= 933. 2518. 3068. 3648.

ELEVATION= 1672. 1678. 1681. 1682.

CREL	SPWID	COOW	EXPW	ELEVL	COOL	CAREA	EXPL
1678.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COOD	EXPD	DAMWID
1682.3	2.7	1.5	1720.

PEAK OUTFLOW IS 861. AT TIME 50.00 HOURS

PEAK OUTFLOW IS 4601. AT TIME 48.00 HOURS

PEAK OUTFLOW IS 6140. AT TIME 47.00 HOURS

PEAK OUTFLOW IS 7573. AT TIME 47.00 HOURS

PEAK OUTFLOW IS 10148. AT TIME 47.00 HOURS

PEAK OUTFLOW IS 12814. AT TIME 46.50 HOURS

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

CHANNEL ROUTING -MOD PULS RESERVOIR -1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	1	0	0	0	0	0	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0500	0.0400	0.0500	1650.0	1680.0	1600.	0.00500

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 1680.00 1000.00 1660.00 1279.00 1653.50 1280.00 1650.00 1320.00 1650.00
1321.00 1653.50 1400.00 1660.00 1475.00 1680.00

STORAGE	0.00	2.35	4.74	8.73	17.63	31.58	50.57	74.58	103.52	13[illegible].38
	176.16	219.86	268.48	322.03	380.49	443.88	512.19	585.42	663.57	746.65
OUTFLOW	0.00	218.03	671.56	1390.22	2734.95	5036.05	8563.30	13574.09	20280.63	28881.14
	39553.41	52459.34	67775.25	85665.23	106288.66	129800.63	156352.22	186091.09	219161.56	255704.97
STAGE	1650.00	1651.58	1653.16	1654.74	1656.32	1657.89	1659.47	1661.05	1662.63	1664.21

	1665.79	1667.37	1668.95	1670.53	1672.10	1673.68	1675.26	1676.84	1678.42	1680.00
FLOW	0.00	218.03	671.56	1390.22	2734.95	5036.05	8563.30	13574.09	20288.63	28886.14
	39553.41	52459.34	67775.25	85665.23	106288.66	129800.63	156352.22	186091.09	219161.56	255704.97

MAXIMUM STAGE IS 1653.5

MAXIMUM STAGE IS 1657.6

MAXIMUM STAGE IS 1658.4

MAXIMUM STAGE IS 1659.0

MAXIMUM STAGE IS 1660.0

MAXIMUM STAGE IS 1660.8

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

CHANNEL ROUTING -MOD PULS REACH 1-2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0800	0.0400	0.0800	1640.0	1660.0	3300.	0.00300

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 1660.00 224.00 1643.50 225.00 1640.00 275.00 1640.00 276.00 1643.50
800.00 1660.00 801.00 1660.00 802.00 1660.00

STORAGE	0.00	4.01	8.07	12.18	17.19	25.80	38.22	54.44	74.47	98.30
	125.94	157.38	192.62	231.67	274.53	321.18	371.65	425.91	483.98	545.86
OUTFLOW	0.00	110.09	346.49	675.32	920.23	1328.67	2016.88	3024.17	4396.49	6175.82
	8418.74	11156.20	14433.55	18290.73	22766.38	27897.98	33721.98	40273.88	47588.40	55695.36
STAGE	1640.00	1641.05	1642.10	1643.16	1644.21	1645.26	1646.31	1647.37	1648.42	1649.47
	1650.52	1651.58	1652.63	1653.68	1654.73	1655.79	1656.84	1657.89	1658.94	1660.00
FLOW	0.00	110.09	346.49	675.32	920.23	1328.67	2016.88	3024.17	4396.49	6175.82
	8418.74	11156.20	14433.55	18290.73	22766.38	27897.98	33721.98	40273.88	47588.40	55695.36

OK. SFG #HFC1DB

MAXIMUM STAGE IS 1643.5

MAXIMUM STAGE IS 1648.5

MAXIMUM STAGE IS 1649.5

MAXIMUM STAGE IS 1650.1

MAXIMUM STAGE IS 1651.2

MAXIMUM STAGE IS 1652.1

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HYDROGRAPH ROUTING

CHANNEL ROUTING -MOD PULS REACH 2-3

ISTAQ	ICOPP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	1	0	0	0	0	0	0	0

ROUTING DATA

ULOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	1	1	0	0		0
	NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
	1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0400	0.0400	0.0800	1638.0	1660.0	1900.	0.00100

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 1660.00 300.00 1641.50 494.00 1641.50 495.00 1638.00 525.00 1638.00
526.00 1641.50 900.00 1641.50 1200.00 1660.00

STORAGE	0.00	1.53	3.10	4.70	35.23	68.33	103.33	140.22	175.00	215.69
	262.26	306.74	353.11	401.38	451.54	503.60	557.55	613.40	671.15	730.79
OUTFLOW	0.00	43.63	134.48	257.36	978.79	2447.33	4516.92	7142.10	10302.95	13991.23
	18205.16	22946.92	28221.23	34034.55	40394.66	47310.12	54790.14	62844.47	71483.17	80716.59
STAGE	1638.00	1639.16	1640.32	1641.47	1642.63	1643.79	1644.95	1646.10	1647.26	1648.42
	1649.58	1650.73	1651.89	1653.05	1654.21	1655.37	1656.52	1657.68	1658.84	1660.00
FLOW	0.00	43.63	134.48	257.36	978.79	2447.33	4516.92	7142.10	10302.95	13991.23
	18205.16	22946.92	28221.23	34034.55	40394.66	47310.12	54790.14	62844.47	71483.17	80716.59

MAXIMUM STAGE IS 1742.0

MAXIMUM STAGE IS 1648.0

D-8

MAXIMUM STAGE IS 1645.7

MAXIMUM STAGE IS 1646.3

MAXIMUM STAGE IS 1647.2

MAXIMUM STAGE IS 1648.1

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HYDROGRAPH ROUTING

CHANNEL ROUTING -MOD PULS REACH 3-4

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
4	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0400	0.0400	0.0800	1635.0	1650.0	1700.	0.00200

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 1650.00 250.00 1640.00 859.00 1638.50 860.00 1635.00 890.00 1635.00
891.00 1638.50 1025.00 1640.00 1200.00 1650.00

STORAGE	0.00	0.93	1.88	2.83	3.81	6.72	20.54	43.97	65.04	95.16
	122.30	150.48	179.69	209.93	241.21	273.52	306.86	341.24	376.65	413.09
OUTFLOW	0.00	32.92	102.32	197.17	312.66	480.36	1034.39	2478.88	4745.20	7678.84
	11220.47	15346.07	20037.99	25284.89	31079.65	37418.13	44298.37	51719.92	59683.66	(8191.52
STAGE	1635.00	1635.79	1636.58	1637.37	1638.16	1638.95	1639.74	1640.53	1641.31	1642.10
	1642.89	1643.68	1644.47	1645.26	1646.05	1646.84	1647.63	1648.42	1649.21	1650.00
FLOW	0.00	32.92	102.32	197.17	312.66	480.36	1034.39	2478.88	4745.20	7678.84
	11220.47	15346.07	20037.99	25284.89	31079.65	37418.13	44298.37	51719.92	59683.66	(8191.52

MAXIMUM STAGE IS 1639.0

MAXIMUM STAGE IS 1641.3

MAXIMUM STAGE IS 1641.7

MAXIMUM STAGE IS 1642.1

MAXIMUM STAGE IS 1642.6

MAXIMUM STAGE IS 1643.2

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1

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 0.20	RATIO 2 0.40	RATIO 3 0.50	RATIO 4 0.60	RATIO 5 0.80	RATIO 6 1.00
HYDROGRAPH AT	INFLOW	13.10	1	2713.	5425.	6781.	8138.	10850.	13563.
		(33.93)		(76.81)(	153.62)(	192.02)(	230.43)(	307.24)(	384.05)(
ROUTED TO	OUTFLOW	13.10	1	861.	4601.	6140.	7573.	10148.	12814.
		(33.93)		(24.38)(	130.30)(	173.86)(	214.44)(	287.35)(	362.86)(
ROUTED TO	1	13.10	1	840.	4598.	6143.	7568.	10150.	12813.
		(33.93)		(23.80)(	130.21)(	173.95)(	214.29)(	287.40)(	362.81)(
ROUTED TO	2	13.10	1	747.	4598.	6144.	7572.	10149.	12823.
		(33.93)		(21.14)(	130.19)(	173.98)(	214.41)(	287.39)(	363.11)(
ROUTED TO	3	13.10	1	570.	4589.	6134.	7555.	10127.	12821.
		(33.93)		(16.14)(	129.95)(	173.69)(	213.94)(	286.77)(	363.06)(
ROUTED TO	4	13.10	1	509.	4590.	6120.	7562.	10128.	12816.
		(33.93)		(14.40)(	129.98)(	173.30)(	214.13)(	286.80)(	362.90)(

1 SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1672.20	1678.30	1682.30
STORAGE	933.	2318.	3648.
OUTFLOW	197.	416.	13135.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.20	1678.64	0.00	2411.	861.	0.00	50.00	0.00
0.40	1680.19	0.00	2844.	4601.	0.00	48.00	0.00
0.50	1680.63	0.00	2965.	6140.	0.00	47.00	0.00
0.60	1681.03	0.00	3082.	7573.	0.00	47.00	0.00
0.80	1681.64	0.00	3554.	10148.	0.00	47.00	0.00
1.00	1682.23	0.00	3619.	12814.	0.00	46.50	0.00

PLAN 1 STATION 1

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	840.	1653.5	50.00
0.40	4598.	1657.6	48.00
0.50	6143.	1658.4	47.50
0.60	7568.	1659.0	47.00
0.80	10150.	1660.0	47.00
1.00	12813.	1660.8	47.00

PLAN 1 STATION 2

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	747.	1643.5	50.00
0.40	4598.	1648.5	48.00
0.50	6144.	1649.5	47.50
0.60	7572.	1650.1	47.00
0.80	10149.	1651.2	47.00
1.00	12823.	1652.1	47.00

PLAN 1 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	570.	1642.0	50.00
0.40	4589.	1645.0	48.50
0.50	6134.	1645.7	47.50
0.60	7555.	1646.3	47.50
0.80	10127.	1647.2	47.00
1.00	12821.	1648.1	47.00

PLAN 1 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	509.	1639.0	50.00
0.40	4590.	1641.3	48.50
0.50	6120.	1641.7	48.00
0.60	7562.	1642.1	47.50
0.80	10128.	1642.6	47.50
1.00	12816.	1643.2	47.00

DAM 583 ISCHOA CREEK DAM #1 REFF. QUAD WEST VALLEY, N.Y.
DRAINAGE DISTANCE RAWSON, N.Y.

DISTANCE L & Lca MEAS. WITH MAP MEASURING WHEEL (1" = 2000')

COMPUTATIONS FOR L DISTANCE

RUN		MEAS. DIST	AVG. DIST.	COEF.	L DISTANCE
A	1	14.6"			
	2	14.9"			
	3	14.8"			
		44.3 ÷ 3 = 14.77	x	2000'	= 29540 FT
B		21.0"			
	2	21.0"			
		42.0 ÷ 2 = 21.0	x	2000'	= 42000 FT.
C	1	21.7"			
	2	21.7"			*
		43.4 ÷ 2 = 21.7	x	2000'	= 43400 FT.

* L = 43400 FT (USED RUN C)

COMPUTATIONS FOR Lca DISTANCE

RUN		MEAS. DIST.	AVG. DIST.	COEF	Lca DISTANCE
C	1	6.8"			
	2	6.8"			*
		13.6" ÷ 2 =	6.8"	x 2000'	= 13600 FT

* Lca = 13600 FT.

$$T_p = C_t (L L_{ca})^{0.3}$$

$$T_r = \frac{T_p}{5.5}$$

$C_t = 2.2$ ✓

$C_p = 0.57$ ~~0.50~~

$$T_{PR} = T_p + 0.25 (T_R - T_r)$$

$L = 43400$ ft $= 8.22$ Mi ✓

$L_{ca} = 13600$ ft $= 2.58$ mi ✓

$T_p = 2.2 (8.22 \times 2.58)^{0.3} = 5.50$ hr. ✓

$T_r = \frac{5.5}{5.5} = 1.0$ hr $\Longrightarrow T_R = 3.0$ hr. ✓

$T_{PR} = 5.5 + 0.25 (3.0 - 1.0) = 6.0$ hr. ✓

WATERSHED

ISCHUA CREEK 1 A MAINLY CONSISTS OF SWAMPS. THEREFORE IT'S STORAGE CAPACITY IS MORE THAN OTHER WATERSHEDS WHICH DO NOT HAVE SUCH STORAGE CAPACITY.

DUE TO THE ABOVE JUDGMENT, THE VALUE OF C_t IS INCREASED FROM 2.0 TO 2.2 . AND THE VALUE OF C_p WOULD BE DECREASED FROM 0.63 TO ~~0.57~~ 0.50

DAM 583 HYDRAULICS

SERVICE SPILLWAY

54" ϕ RCP ✓ w/ $4\frac{1}{2}'$ x $13\frac{1}{2}'$ RISER. ✓

FROM DESIGN REPORT : $Q_s = 416$ @ ELEV. 1678.3 ✓

$Q_s = 0$ @ ELEV. 1672.2 ✓

THE CROSS SECTIONAL AREA OF RCP IS ASSUMED TO CONTROL.

$$Q_s = C_o A_o \sqrt{2g H_o}$$

$$A_o = \left[(54/12)^2 / 4 \right] \pi = 15.90 \text{ ft}^2 \checkmark$$

$$H = 1678.3 - 1672.2 = 6.1' \checkmark$$

$$C_o = \frac{Q_s}{A_o \sqrt{2g H_o}} = \frac{416}{15.90 \sqrt{2 \times 32.2 \times 6.1}} = 1.32$$

$$Q_s = 1.32 \times 15.90 \times (2 \times 32.2)^{0.5} \cdot H^{1/2}$$

$$Q_s = 168.43 \, H^{0.5} \checkmark$$ [Use only for elevations higher than the crest of riser (1672.2)]

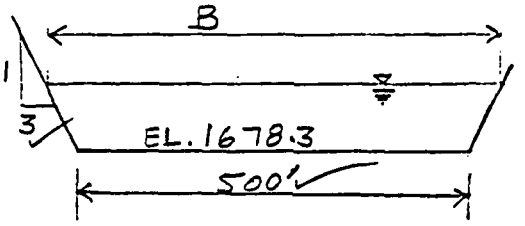
$$Q_s = 168.43 H^{0.5}$$

	SERVICE SPILLWAY DISCHARGE ELEVATION RELATIONSHIP		
	ELEV.	H_o	Q_s
*	1672.2	0	
	1674		
	1676		
**	1678.3	6.1	416 ✓
	1679	6.8	439 ✓
	1680	7.8	470 ✓
	1681	8.8	500. ✓
	1682	9.8	527 ✓
***	1682.3	10.1	535 ✓
	1683	10.8	554 ✓
	1684	11.8	579 ✓
	1685	12.8	603 ✓

* SERVICE SPILLWAY CREST
** EMERGENCY SPILLWAY CREST
*** TOP OF DAM

EMERGENCY SPILLWAY

$$Q_c = \sqrt{\frac{gA^3}{B}}$$



FOR $y = 1'$

$B = 3' + 500' + 3' = 506'$ ✓

$A = \frac{506+500}{2} \times 1 = 503\ ft^2$ ✓

Accumulated cross section of the two Emergency spillway cross sections

$S_o = 0.042$ ✓

$Q_c = \sqrt{\frac{32.2 \times 503^3}{500}} = 2863\ cfs$ ✓

$$k = \frac{1.49}{n} AR^{2/3} = \frac{1.49}{0.035}(503)\left[\frac{503}{500 + 2(1+9)^{0.5}}\right]^{2/3}$$

$k = 21319.59$ ✓

$$S_c = \left(\frac{Qe}{k}\right)^2 = \left(\frac{2863}{21319.59}\right)^2 = 0.018$$ ✓

spillway slope > critical slope

$0.042 > 0.018$ ✓

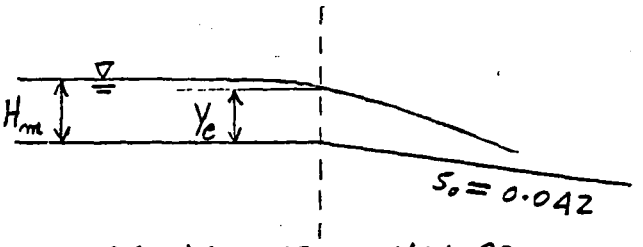
∴ Flow goes Through critical depth for $y = 1'$ and also for $y > 1'$

USE TABLE 8-7 FROM "KING + BRATER"

$Z = 3/1 = 3$ ✓

$b = 500'$ ✓

$Q_E = C_2 b H_m^{1.5}$



EMERGENCY SPILLWAY PROFILE

EMERGENCY SPILLWAY, Q - ELEVATION RELATIONSHIP

H_m	$\frac{H_m Z}{b}$	C_2	Q_E	ELEV.
0	0		0 ✓	1678.3
0.7	0.00	3.09	905 ✓	1679
1.7	0.01	3.11	3447 ✓	1680
2.7	0.02	3.13	6943 ✓	1681
3.7	0.02	3.13	11138 ✓	1682
4.0	0.02	3.15	12600 ✓	1682.3
4.7	0.03	3.17	16150 ✓	1683
5.7	0.03	3.17	21570 ✓	1684
6.7	0.04	3.19	27661 ✓	1685

ISCHUA CREEK DAM # 1

$A = RAREA RESERVOIR SURFACE AREA IN ACRES
$E = RELEV. RESERVOIR ELEVATION IN FEET

REFF. U.S. DEPT. A.S.C.A AS BUILT PLANS DWG.
DESIGN REPORT " " NY-601-R pg. 2

ELEV. 1672.2 = 167 AC. GIVEN NY-601-R ✓

ELEV. 1678.3 = 280. Ac. GIVEN NY-601-R ✓

ELEV. 1681.0 = 320. Ac. GIVEN NY-601-R ✓

ELEV. 1682.3 = 347. Ac. GIVEN NY-601-R ✓

Refer to sub sheet 9. SCS storage values were used instead of surface area values.

TOTAL SPILLWAYS DISCHARGE		
ELEV.	$Q_s + Q_E$	RESERVOIR SURFACE AREA
1672.2	* 197	167 AC.
1674	* 260	
1676	* 340	
1678.3	* 416	280 AC.
1679	1344	
1680	3917	
1681	7443	320 AC.
1682	11665	
1682.3	13135	347 AC.
1683	16704	
1684	22149	
1685	28264	

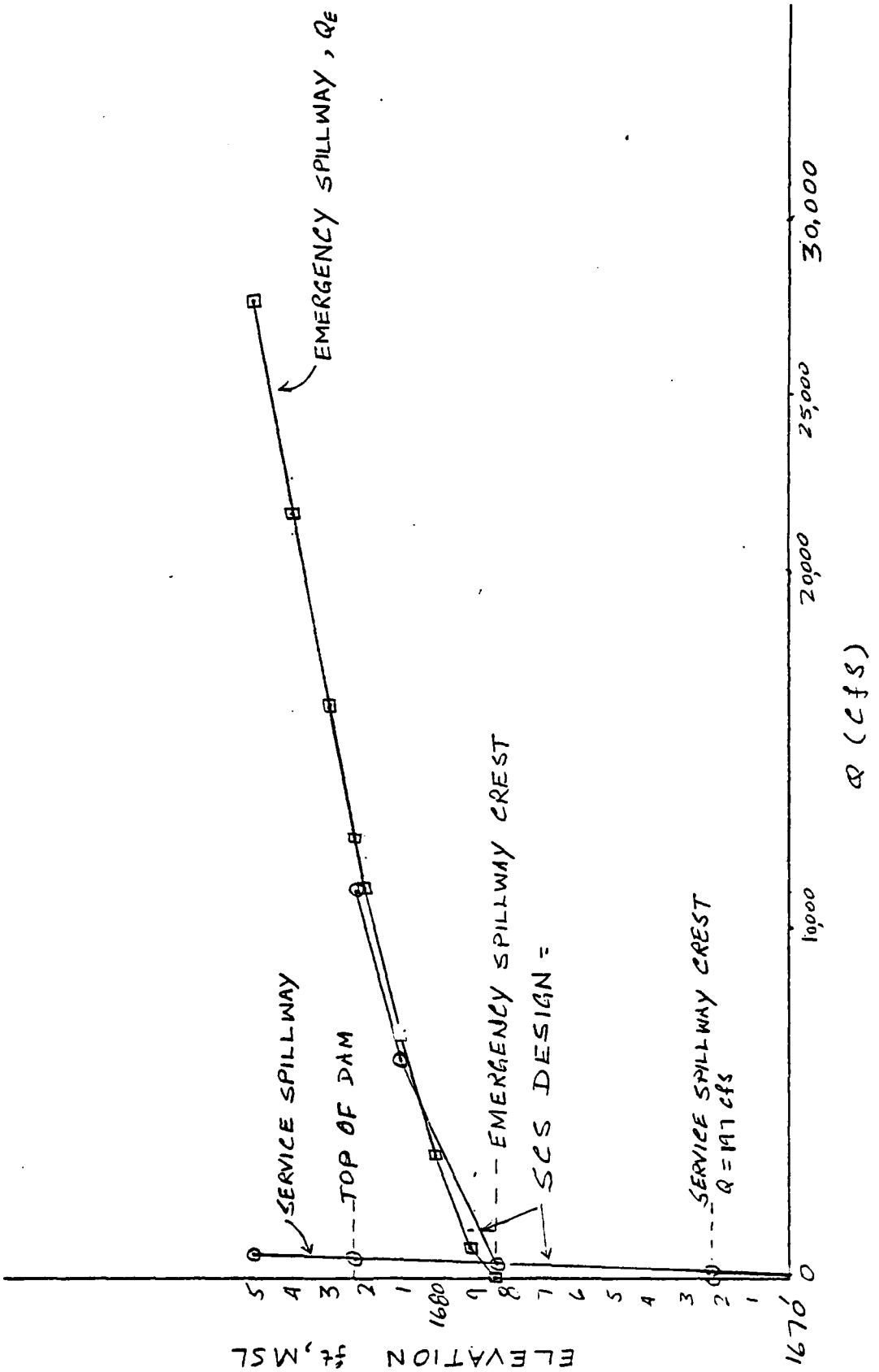
* SCS DESIGN FLOW IS ADAPTED

BY E. T. DATE 3/31/81 ERDMAN, ANTHONY, ASSOCIATES SHEET 1 OF 12

D ZRA DATE 4/1/81 SUBJECT DAM 583-HYDRAULICS SUB-SHEET NO. 7

OWNER PROJECT NAME DAM INSPECTION 80166-00.07

SPILLWAY RATING CURVE



VALUES ON $D CARD OF HEC-1 PROGRAM

FIELD	VARIABLE	VALUE
0	ID	$D
1	TOPEL	1682.3 ✓
2	CØQD	2.7 ✓
3	EXPD	1.5 ✓
4	DAMWID	1230' + 490' = 1720' ✓

DAM 583 - HYDRAULICS

Use SCS design report storage values, subtracting 29 AF of sediment accumulation.

Elevation	Storage
1672.2	933
1678.3	2318
1681.0	3068
1682.3	3648

Emergency Spillway Velocities

Flood	Q_{from}	Elev.	Q_E	A	V	Comments
PMP	12,814 ✓	1682.23 ✓	12,259 ✓	1305 ✓	9.4 ✓	> 8 ft/sec ∴ erosion ✓
½ PMP	6140 ✓	1680.63 ✓	5649 ✓	818 ✓	6.9 ✓	< 8 ft/sec ∴ no erosion ✓

PMF

$$\begin{bmatrix} \text{Elev.} \\ 1682 \\ 1682.23 \\ 1682.3 \end{bmatrix}_{.23} \times \begin{bmatrix} Q_E \\ 11{,}138 \checkmark \\ y \\ 12{,}600 \checkmark \end{bmatrix}_{1462} \qquad \frac{0.23}{0.30} = \frac{x}{1462} \qquad y = 12{,}259 \text{ cfs.} \checkmark$$

since $y_n/b < 0.02$

$$* \; y_n = 0.789 \left(\frac{Q n}{b S^{1/2}}\right)^{0.6} = 0.789 \left(\frac{12{,}259 \times 0.06}{500 (.042)^{1/2}}\right)^{0.6} = \underline{2.57 \text{ ft}} \checkmark$$

$$A = \frac{1}{2}\left(500 + [2.57(3.0)(2) + 500]\right) \times 2.57 = \underline{1305 \text{ ft}^2} \checkmark$$

$$V = \frac{Q}{A} = \frac{12{,}259}{1305} = \underline{9.4 \text{ ft/sec}} \checkmark$$

½ PMF

$$\begin{bmatrix} \text{Elev.} \\ 1680 \\ 1680.63 \\ 1681 \end{bmatrix}_{.63} \times \begin{bmatrix} Q_E \\ 3447 \checkmark \\ y \\ 6943 \checkmark \end{bmatrix} \qquad \frac{0.63}{1.00} = \frac{x}{3496} \qquad y = 5649 \text{ cfs} \checkmark$$

* Ref: Table 103E "Fundamentals of Open Channel Hydraulics", C. Rouse

since $y_n/b < 0.02$ use.

$$y_n = 0.789 \left(\frac{Q n}{b S_f^{1/2}}\right)^{0.6} = 0.789 \left(\frac{5649 (0.06)}{500 (0.042)^{1/2}}\right)^{0.6} = \underline{1.62 \text{ ft}}$$

$$A = \frac{1}{2}\left(500 + [1.62(3.0)(2) + 500]\right) 1.62 = \underline{818 \text{ ft}^2}$$

$$V = Q/A = \frac{5649}{818} = \underline{6.9 \text{ ft/sec}}$$

AD-A105 774 ERDMAN ANTHONY ASSOCIATES ROCHESTER NY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. ISCHUA CREEK WATERSHED DAM NUMBER --ETC(U)
AUG 81 R J FARRELL DACW51-81-C-0017
UNCLASSIFIED NL

PRR DATE 3/23/81 ERDMAN, ANTHONY, ASSOCIATES SHEET 14 OF 15

B.R. DATE 3/24/81 SUBJECT DAM 583 ROUTING SUB-SHEET NO. 1.

OWNER PROJECT NAME DAM INSPECTION 80166-00.07

PRR 4/13/81
B.R. 4/13/81

ISCHUA CREEK DAM 1

DAM DATA FROM AS-BUILT PLAN

DAM TOP ELEV. = 1662.3

DAM INV. ELEV. = 1658.25

REVISED CROSS SECTIONS ✓

1680/0, 1660/1000, 1653.5/1279, 1650/1280, 1650/1320, 1653.5/1321, 1660/1400, 1680/1475

REACH 1 LENGTH = 1600'

CROSS SECT: 1680/0, 1660/1000, 1650/1295, 1650/1305, 1660/1400, 1680/1475

SLOPE: DAM INV. - REACH 1 INV. = h ÷ L = SLOPE ✓

1658.3 - 1650 = 8.3 ÷ 1600' = 0.005

REACH 2 LENGTH = 3300'

CROSS SECT. 1660/0, 1640/245, 1640/255, 1660/800

REVISED CROSS SECTIONS ✓

1660/0, 1643.5/224, 1640/225, 1640/275, 1643.5/276, 1660/800

SLOPE: REACH 1 INV. - REACH 2 INV. = h ÷ L = SLOPE ✓

1650 - 1640 = 10' ÷ 3300' = 0.003

REACH 3 LENGTH = 1900'

CROSS SECT. 1660/0, 1640/800, 1638/505, 1638/515, 1640/900, 1660/1200

REVISED CROSS SECTIONS ✓

1660/0, ~~1640~~ 1641.5/300, ~~1639.5~~ 1641.5/494, 1638/495, 1638/525, ~~1639.5~~ 1641.5/526, ~~1640~~ 1641.5/900, 1660/1200

SLOPE: REACH 2 INV. - REACH 3 INV = h ÷ L = SLOPE ✓

1640 - 1638 = 2' ÷ 1900' = 0.001

REACH 4 LENGTH = 1700'

CROSS SECT. 1640/0, 1635/620, 1635/630, 1640/775

SLOPE: REACH 3 INV. - REACH 4 INV. = h ÷ L = SLOPE

1638 - 1635 = 3' ÷ 1700' = 0.002 ✓

REVISED CROSS SECTION ✓

1650/0, 1640/250, ~~1638.5~~ 1639/859, ~~1635~~ 1636/860, ~~1635~~ 1640/890, ~~1638.5~~ 1641/891, ~~1640~~ 1650/1025, 1650/1200

BY MRH DATE 4/10/81
CHKD B.R. DATE 4/13/81
OWNER

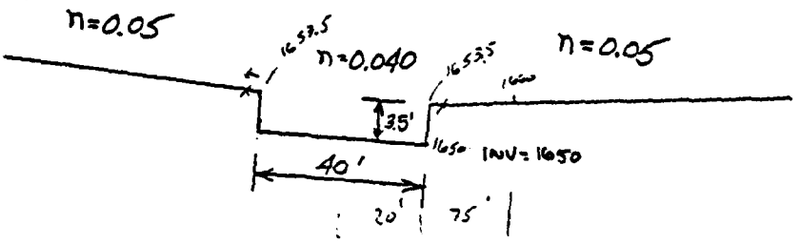
ERDMAN, ANTHONY, ASSOCIATES

SUBJECT DAM 583 - CHANNEL ROUTING
PROJECT NAME DAM INSPECTIONS (80166-00.07)

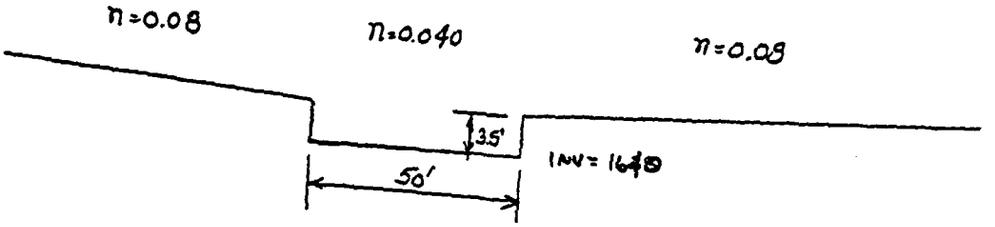
SHEET 15 OF 15
SUB-SHEET NO. 1

DAM NY 583 - DOWNSTREAM CHANNEL SECTIONS

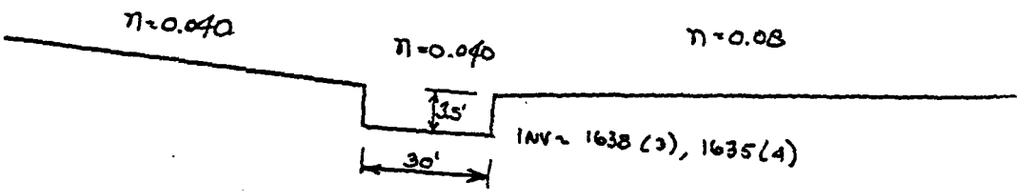
SECTION 1



SECTION 2



SECTION 3 & 4



APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS

80/11/18. PAGE 127

FORM 8678 ITEM	NOMENCLATURE	DATA
1	ID	NY00583
2	DIVISION	NAD
3	STATE	33
4	COUNTY	009 (CATTARAUGUS)
5	CONGR. DIST.	39
6	2ND STATE	
7	2ND COUNTY	
8	2ND CONGR	
9	OFF. DAM NAME	ISCHUA CREEK WATERSHED DAM SITE #1
10	LATITUDE	42-24.8
11	LONGITUDE	078-30.3
12	REPORT DATE	80/09/16.
13	POPULAR NAME	NONE
14	IMPOUND. NAME	UNKNOWN
15	REGION	04
16	BASIN.	12
17	RIVER/STREAM	ISCHUA CREEK
18	D/S CITY-TOWN	MACHIAS
19	DISTANCE	000
20	POPULATION	00000500
21	TYPE OF DAM	RE
22	YEAR COMPLETED	1968
23	PURPOSES	C 21
24	STR. HEIGHT	0026
25	HYD. HEIGHT	0023
26	MAX CAPACITY	~~00000000~~ 3677
27	NORMAL CAP.	~~00000050~~ 0
27A	CORPS DIST.	NCB
27B	OWNER CODE	N
27C	FED. REGULATED	N
27D	PVT. ON FED.	N
27E	SCS ATD	Y
27F	VERIFY DATE	80/09/25.

FORM 8678 ITEM	NOMENCLATURE	DATA
28	(SEE BELOW)	
29	D/S HAZARD	1
30	CREST LENGTH	~~0050~~ 1720+548=2268
31	SPILLWAY TYPE	U
32	SPILLWAY WIDTH	0500+48=548
33	MAX DISCHARGE	~~0035000~~ 12600 13135
34	VOLUME	~~00000000~~ 66950
35	POWER INSALLED	
36	POWER PROPOSED	
37	NO. OF LOCKS	0
38-45	LOCK LEN/WID	
46	OWNER NAME	CATTARAUGUS COUNTY MIKE BAUCH
47	ENGINEERING	SCS
48	CONSTRUCTION	
49	REG. DESIGN	DEC
50	REG. CONST	DEC
51	REG. OPER.	DEC SCS
52	REG. MAINT.	DEC
53	INSPECTOR	
54	INSP. DATE	
55	INSP. AUTH.	EN CON LAW SECT 15-0507
56	(SEE BELOW)	
57	INSP. INIT.	OLAPIC BI
58	UNSAFE	
59	URGENCY	
60	INSP. COMPL.	15 MAY 81
61	RPT. APPR.	
62	GOV. NOTIF.	
63	INSPECTOR	DC
64	GOV. RPT.	
65	DEFICIENCY	OP

28 REMARK 1-10-19-3241 20-ESTIMATE 27-NOT NORMALLY FULL

56 REMARK 1-10-19-3241 30-~~UNCONTROLLED~~ ~~15'x15' RISER~~ 32-TOTAL OF 2 EMERGENCY SPILLWAYS ~~AND PRINCIPAL SPILLWAY~~ ~~1 of 54" dia. pipe~~

INSP. REMARK

33-TOTAL OF BOTH EMERGENCY SPILLWAYS AND PRINCIPAL SPILLWAY

EMERGENCY SPILLWAY; PRINCIPAL SPILLWAY IS A 54" CONDUIT AND 13.5'x4.5' RISER

E-1